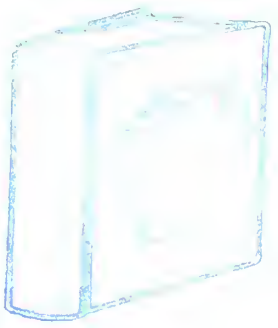

STATUS OF BOBWHITE POPULATIONS
IN SOUTHERN ILLINOIS
1977

Prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory
Southern Illinois University
Carbondale, Illinois

W. D. Klimstra, Director

April 7, 1978

The Cooperative Wildlife Research Laboratory, SIU-C, has collected quail wings from southern Illinois each season since 1950. Age determination of these wings and analysis of accompanying information from cooperating hunters provide indices of annual productivity and current population status. The primary purpose of this research is: (1) to establish a long-term record of population performance in order to better identify and interpret current and future trends in quail numbers, (2) to determine which environmental factors are most responsible for annual variation in bobwhite productivity and hunter success, and (3) to develop the basis for predicting this variation prior to the hunting season. Other population characteristics such as hatching chronology and differential winter survival of sex-age classes are also investigated.

Data are collected from the southern 34 counties of Illinois and separated into two regions as shown in Figure 1. This division is based on seven criteria: bobwhite age ratios, hunter success rates, proportion of county wooded, annual mean temperature, annual rainfall, annual days of snow cover, and physiographic classification. Weather data are collected from 30 stations throughout southern Illinois (Fig. 1). Daily temperature and rainfall records are obtained from each station via the Illinois Climatological Data and combined into periods corresponding to major life-history stages of the bobwhite (Fig. 2).

Wing Analysis

Collection materials and requests for cooperation were mailed to 164 quail hunters prior to the 1977 season; less than one-half (74) submitted wings. A total of 3,046 wings were received and examined compared to 3,663 in 1976 and 4,113 in 1975. The sex-age composition of this sample appears

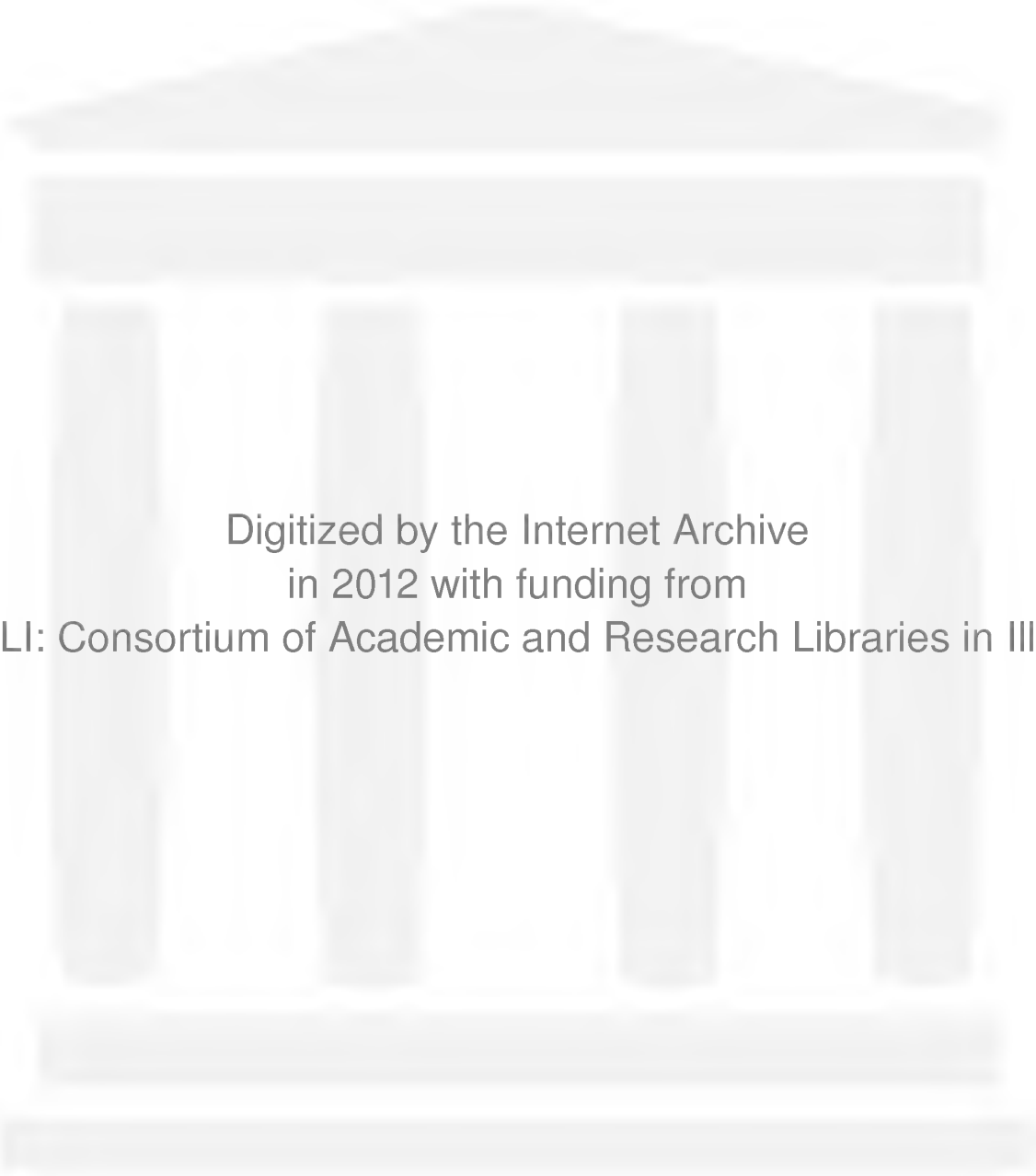

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Figure 1. Weather stations in the North and South Regions of southern Illinois.

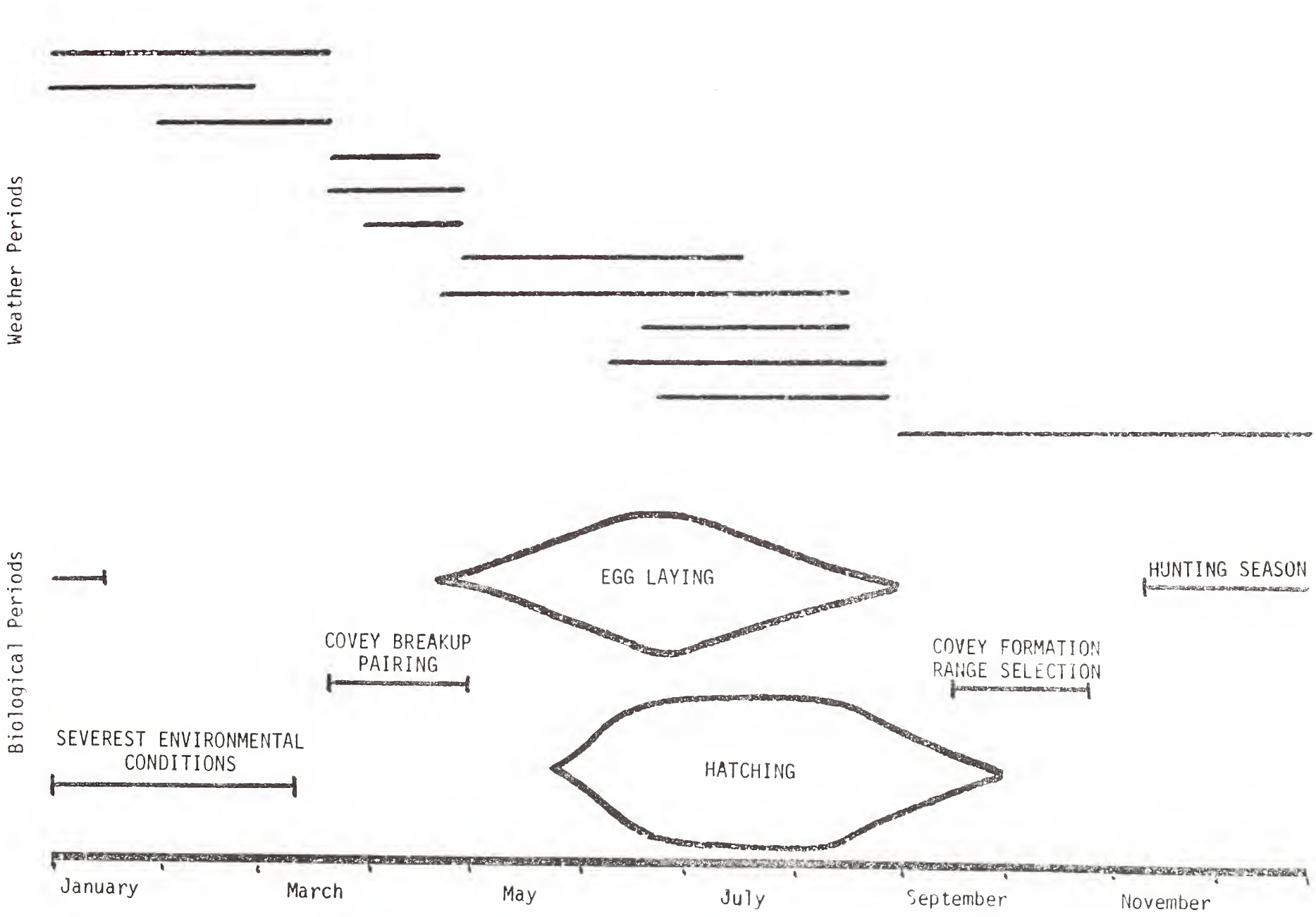

Figure 2. Major stages in the bobwhite's annual cycle and corresponding weather periods analyzed.

in Table 1. The North Region had a juvenile:adult ratio of 7.07:1 compared to the long-term mean of 5.40:1. In the South Region, 4.27 juveniles were harvested for every adult compared to the long-term mean of 4.31. As usual, males comprised about one-half (49.3 percent) of the juveniles and three-fifths (60.2 percent) of the adults. Backdating estimated age at date of kill revealed that about 32 percent of the juveniles hatched on or after July 29 compared to the normal 27-28 percent.

Table 1. Sex and age composition of 3,046 bobwhites harvested during the 1977 open season in southern Illinois.

NORTH REGION					
	Males	Females	Unknown	Total	Percent
Juveniles	664	646	19	1,329	87.61
Adults	112	74	2	188	12.39
Total	776	720	21	1,517	100.00
SOUTH REGION					
	Males	Females	Unknown	Total	Percent
Juveniles	587	640	12	1,239	81.03
Adults	171	113	6	290	18.97
Total	758	753	18	1,529	100.00
ENTIRE AREA					
	Males	Females	Unknown	Total	Percent
Juveniles	1,251	1,286	31	2,568	84.31
Adults	283	187	8	478	15.69
Total	1,534	1,473	39	3,046	100.00

Hunter Questionnaire

Eighty-one of the 164 hunters contacted returned their post-season questionnaires. Information obtained from those who did respond is shown in Table 2. Hunters in the North Region reported bagging 2,115 quail during 689 trips for an average of 3.07 birds per trip. This rate of success was about 8.4 percent below 1976 and 19.6 percent below the 1960-76 average. In the South Region, cooperating hunters reported harvesting 2,215 bobwhites in 525 trips. This success rate of 4.22 birds per trip was 6.7 percent above last year's figure and very near the long-term mean. It should be noted that moisture conditions during most of last season were much more conducive to good dog work than they were in 1976; consequently, it is difficult to compare hunter success data for the two years.

Table 2. Results of the 1977 post-season quail hunter survey.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	48	2,115	689	3.07
South	26	2,215	525	4.22
Total	74	4,330	1,214	3.57

	1977 Population Compared to 1976			
Region	More	Same	Less	Index[1]
North	7	8	35	-5.60
South	13	9	8	+1.67
Total	20	17	43	-2.88

[1] Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing these products and dividing by the total number of respondents.

When asked to compare the 1977 population with that of 1976, only 14 percent of the North Region hunters said that it was up, 16 percent felt it was about the same, and 70 percent believed it to be down. These data convert to an abundance index of -5.60 on a scale of +10 to -10 (Table 2). In the South Region, 43 percent of the hunters said the population was up, 30 percent thought it was about the same, and 27 percent said it was down for an abundance index of +1.67. The overall index for the entire 34-county region was -2.88.

Population Status in 1977

As illustrated by the above data, there was substantial variation in bobwhite abundance throughout southern Illinois in 1977. The line of demarcation separating normal and below-normal densities seemed to follow the northern border of the Shawnee Hills or about one tier of counties below our North-South division (Fig. 1). In the seven counties of Union, Johnson, Pope, Hardin, Alexander, Pulaski, and Massac, 95 percent of the cooperators thought that the 1977 population equalled or exceeded that of 1976. In contrast, good populations were reported from only scatter localities in the northern 27 counties. Individual cooperators in Randolph, Madison, Fayette, Clay, and Crawford counties said the population was up and one hunter in St. Clair County said it was: "The most birds I have seen in 25 years of hunting." However, the following comments were more typical:

". . . ¼ usual crop . . . some places hardly any."
White Co.

". . . only got one covey up the whole year."
Randolph Co.

"Very poor." Wayne Co.

"Lots less." Wayne Co.

"Worst season in 30 years." Clinton Co.

"Terrible." Perry Co.

". . . poorest season I ever had." Perry Co.

"Very poor." Marion Co.

"Very poor." Lawrence Co.

"The poorest season in 40 years." Crawford Co.

"Very poor - not enough birds to hunt." Jasper Co.

"It was the worst I have experienced in 33 years of quail hunting." Washington Co.

"Hunting this year in southern Illinois was the worst I have ever seen." Wayne Co.

"Hunting as a whole was the worst that Fayette Co. has seen in 30 years."

The obvious decline in bobwhite abundance throughout portions of southern Illinois was not unexpected in view of the severity of the 1976-77 winter. Somewhat surprising, however, was that populations in certain areas, particularly the southernmost seven counties, were not greatly affected. There may have been several reasons for this phenomenon: (1) winter weather conditions were somewhat less severe here than in the North, (2) heavy, protective cover such as Japanese honeysuckle is more abundant and more favorably interspersed with food producing areas than in the North where monoagricultural practices encourage very large fields, and (3) the rougher terrain affords greater protection from high winds and drifting snow and also promotes more rapid melting of snow cover from southern exposures.

Data from Department of Conservation call count routes and from our own 1550-acre study area near Carbondale suggested that 1977 breeding densities had not been severely reduced by the preceding winter. However, as mentioned in last year's report, hard winters may adversely affect reproduction the following summer. Based on age structure of the harvested sample, summer

production in the South Region appeared to be about normal although the hatch was somewhat late. One factor which may have contributed to adequate production was favorable temperature and moisture conditions during last spring and summer, especially the critical pre-breeding period of late March and April (Table 3).

At first glance, the very high juvenile:adult ratio from the North sample would seem to have indicated excellent production. However, we know that this was not the case based on fall densities. What this high juvenile:adult ratio did, in fact, indicate was an abnormally high rate of adult loss between spring and fall. Generally, such losses amount to about 40 percent of the March population; however, last year's adult summer mortality may have been as high as 60-80 percent. These unusually heavy losses probably reflected the physiological stresses of reproduction added to those already imposed by the previous winter.

Prospects for 1978

In many ways, this past winter of 1977-78 was even more severe than 1976-77. Temperatures were not as extreme, but snow cover persisted much longer. Because of this, the prospects for high bobwhite populations in 1978 do not appear particularly good. However, as was made very clear this past year, those local populations which have access to adequate habitat, including high quality food in close proximity to heavy cover, will fare much better than those existing in marginal range. Thus, it seems likely that next fall's population will again be very spotty with an overall downward trend being evident in many areas.

Table 3. Temperature and moisture conditions during various stages of the bobwhite's annual cycle, 1977.

Period		Mean Daily Temperature	Deviation From Normal	Days of ≥ 1" Snowcover	Total Rainfall	Percent of Normal
NORTH REGION						
January 1 - March 21	(Winter)	18.8[1]	-7.5	45.1[4]	--	--
March 22 - April 30	(Prebreeding)	58.5[2]	+5.0	--	5.96	113.5
May 1 - July 19	(Peak egg laying)	74.0[2]	+2.6	--	8.42	76.2
June 10 - August 28	(Hatching)	87.2[3]	-0.5	--	12.84	130.4
April 21 - August 18	(Total egg laying, peak hatching)	73.3[2]	+1.5	--	14.64	91.1
SOUTH REGION						
January 1 - March 21	(Winter)	22.4[1]	-6.5	35.0[5]	--	--
March 22 - April 30	(Prebreeding)	60.4[2]	+4.5	--	8.40	143.6
May 1 - July 19	(Peak egg laying)	75.1[2]	+2.2	--	8.26	76.0
June 10 - August 28	(Hatching)	88.5[3]	-0.1	--	11.73	125.6
April 21 - August 18	(Total egg laying, peak hatching)	74.8[2]	+1.5	--	16.07	101.9

[1]Minimum daily temperature (F)
[2]Average daily temperature (F)
[3]Maximum daily temperature (F)
[4]Long-term mean = 14.6 days

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1978-79

prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

W. D. Klimstra, Director

April 1, 1979

The Cooperative Wildlife Research Laboratory, SIU-C, has collected quail wings from southern Illinois each season since 1950. Age determination of these wings and analysis of accompanying information supplied by cooperating sportsmen provide indices of hatching chronology, sex-age composition, annual productivity, and current population status. The primary objectives of this research are to: (1) establish a long-term record of population performance to better identify and interpret current and future trends in quail abundance, (2) identify those environmental variables most responsible for annual variation in bobwhite productivity and hunter success, and (3) develop methods for predicting this variation prior to the hunting season to facilitate management decisions.

Data are collected from the southern 34 counties of Illinois and separated into two regions for analysis (Fig. 1). Weather information is collected from 30 stations throughout the entire area and analyzed on the basis of corresponding major life-history periods of the bobwhite.

Wing Analysis

Collection materials and requests for cooperation were mailed to 214 quail hunters prior to the 1978-79 season; less than 40 percent (83) submitted wings. A total of 2,316 wings were received and examined compared to 3,046 in 1977 and 3,663 in 1976. The sex-age composition of this sample is shown in Table 1. The North Region had a juvenile: adult ratio of 6.04:1 compared to the long-term mean of 5.53:1. In the South Region, 4.35 juveniles were harvested for every adult - very near the long-term mean of 4.37. The higher-than-normal juvenile:adult ratio in the North, coupled with a low fall population, is indicative of high adult summer mortality and/or a breeding population below carrying capacity.

Figure 1. North and South Regions of southern Illinois.

Table 1. Sex and age composition of 2,316 bobwhites harvested during the 1978 open season in southern Illinois.

Region	Males	Females	Unknown	Total	Percent
North					
Juveniles	573	524	14	1,111	85.79
Adults	110	74	0	184	14.21
Total	683	598	14	1,295	100.00
South					
Juveniles	432	398	0	830	81.29
Adults	119	72	0	191	18.71
Total	551	470	0	1,021	100.00
Entire Area					
Juveniles	1,005	922	14	1,941	83.81
Adults	229	146	0	375	16.19
Total	1,234	1,068	14	2,316	100.00

Slightly over one-half (52%) of the juveniles and three-fifths (61%) of the adults were males. Hatching chronology was near normal as about 30 percent of the young hatched on or after July 29.

Hunter Questionnaire

Over half (118) of the 214 hunters contacted returned their post-season cards although not all hunted or answered every question. Those in the North Region reported bagging 1,865 birds during 776 trips for an average of 2.40 quail per trip (Table 2). In the South Region, cooperating hunters reported taking 1,821 birds in 476 trips or 3.83 birds per trip. These success rates were 22 and 9 percent below last year for the North and South regions, respectively. The weighted kill/trip index for the entire area (2.76) was the lowest since we began recording the statistic in 1960.

In agreement with the above findings, the vast majority (84%) of those responding felt that the population was lower in 1978 than in 1977. Thirteen percent thought there were about the same number and just over 3 percent said there were more birds this year than last (Table 3). The relative abundance index of -8.04 (possible +10 to -10) was the second lowest since we began recording the statistic in 1952.

Past and Current Trends

As quail hunters are very much aware, bobwhite populations have been quite low in many parts of southern Illinois the past several seasons, especially in the North Region. Hunters responding to the questionnaires most commonly blamed the recent severe winters, changing land-use practices, and predation, especially by coyotes.

Table 2. Harvest data as reported by cooperating hunters, southern Illinois, 1978-79.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	70	1,865	776	2.40
South	34	1,821	476	3.83
Total	104	3,686	1,252	2.94 (2.76)[1]

[1]Weighted (by area) mean

Table 3. Hunter opinions regarding quail population size in 1978 vs. 1977.

Region	More	Same	Less	Index[1]
North	2	7	68	-8.57
South	2	7	26	-6.86
Total	4	14	94	-8.04

[1]Index obtained by multiplying the number of "mores"by +10, the number of "lesses" by -10, summing their products and dividing by the total number of respondents.

To view the current situation in perspective, the annual kill/trip index from 1960 to the present was plotted (Fig. 2). This index was not available during the late 1950's; but, populations then were very high based on existing data. Two important phenomena are evident from Figure 2. First, populations have tended to shift from high to low and back again. These short-term periodic ups and downs primarily reflect weather conditions, especially duration of snow cover, and possibly an inherent cyclic pattern within the population or ecosystem. However, the limits of these oscillations have been steadily declining over the years - clearly a reflection of deteriorating habitat conditions for the bobwhite over much of southern Illinois. This deterioration is directly related to an overall reduction in the diversity and interspersion of various land-use types. Particularly harmful have been those agricultural practices which emphasize large, borderless fields of row crops at the expense of hedgerows, small woodlots, and scattered idle corners and edges.

Population fluctuations caused by adverse weather may be quite drastic but are usually temporary. In contrast, declining habitat conditions due to changing land use and farming practices tend to have a cumulatively depressing effect on bobwhite numbers. This is not to say that quail cannot respond to improved habitat, only that factors which influence land use are not easily reversed.

Severe weather tends to exert a greater relative impact when populations are high or where habitat is not optimum. The reason is that during periods of abundance, some coveys are forced to inhabit marginal ranges - apparently the result of socially induced spacing mechanisms inherent in the species. These poorly situated birds may do reasonably well during years of normal weather. However, when severe winters occur, they suffer disproportionately

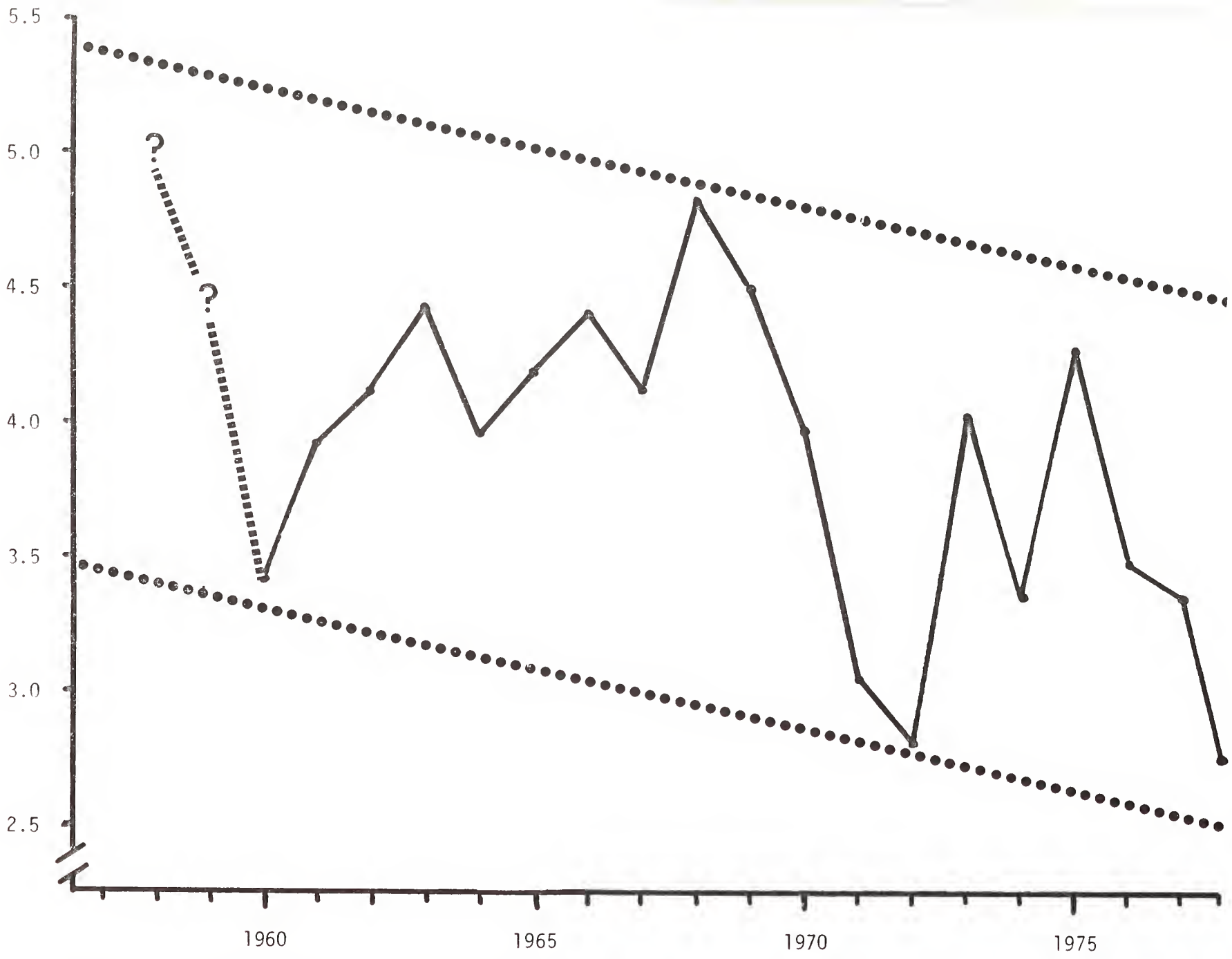

Figure 2. Success rate of quail hunters in southern Illinois, 1960-1978.

high mortality and lowered reproductive potential. Obviously, where high quality habitat is abundant, more coveys are able to occupy secure ranges which help to buffer the adverse impact of severe weather. Several hunters remarked that recent declines seemed less in areas of superior habitat.

The relative severity of the past three winters, in terms of duration of snow cover, is shown in Figure 3. The number of days of snow cover $\geq$ 1 inch during each of these years was 4-5 times normal and may have been greater than any experienced in the last 60 years or so. That three such winters occurred in succession leaves little doubt as to why bobwhite populations are depressed.

About 15 percent of those hunters offering comments recommended that the season be closed or shortened until populations recover. Another 10 percent felt that stocking was the answer while a few called for predator control. At the risk of alienating some of these obviously concerned sportsmens I will offer my opinions on each of these suggestions. In my judgement, artificial propogation (stocking) and/or predator control to increase natural populations are not sound management techniques. Numerous studies have repeatedly shown that mortality rates among released birds are extremely high. During one intensive investigation in southern Illinois, 5,200 birds were released on 2,000 acres over a 6-year period while hunter harvests and population densities were carefully monitored. Even though hunting pressure was fairly high (average 42 percent of fall populations), and pen-reared birds are generally more vulnerable to the gun, only 14 percent were ever harvested. Highest returns (55%) were obtained for those birds turned out during the season (essentially put-and-take shooting). Less than 1 percent of those stocked in the spring ever showed up in

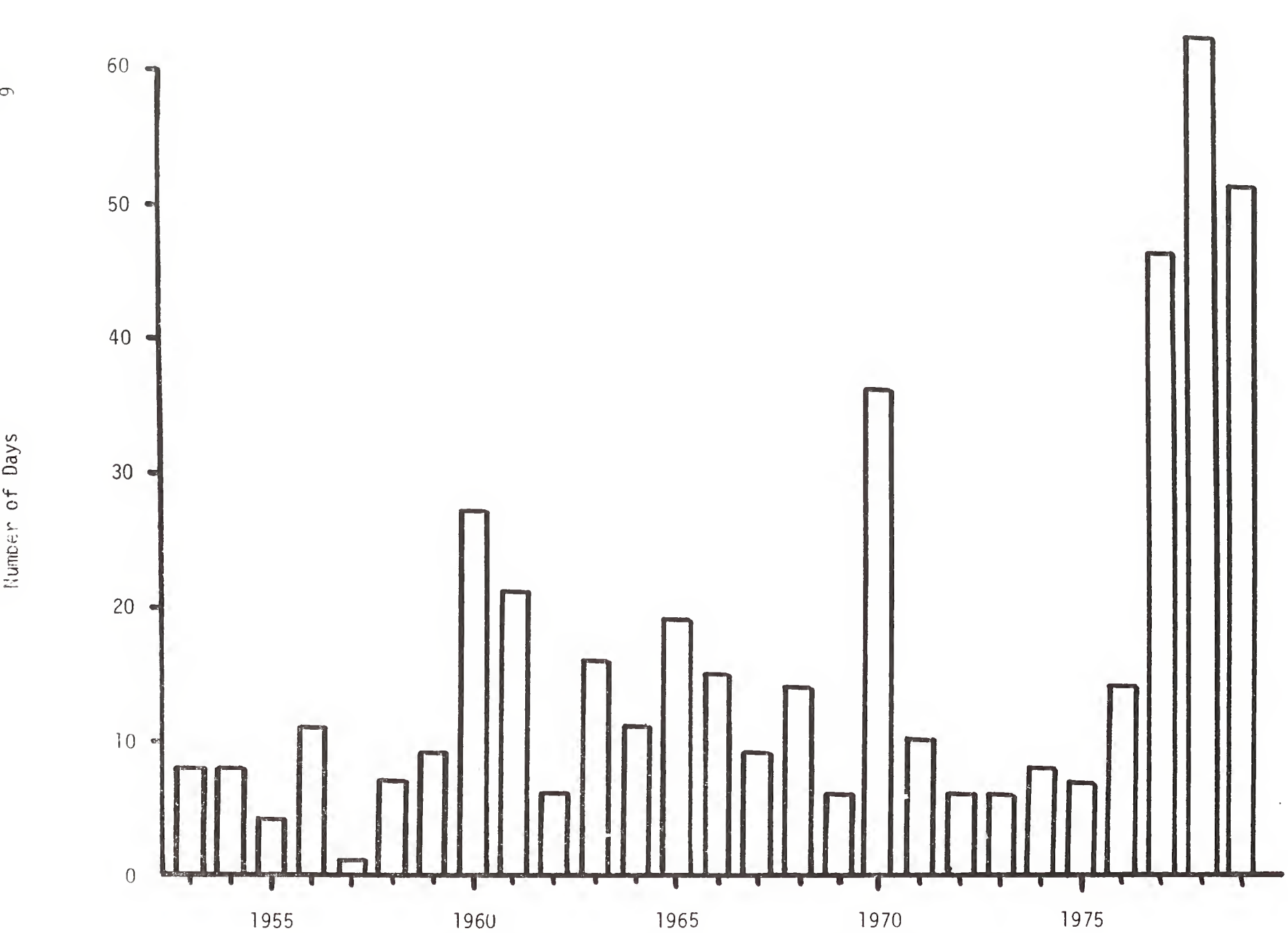

Figure 3. Number of days of snowcover $\geq$ 1 inch, Carbondale, 1953-54 - 1978-79.

hunter bags. In Kansas, researchers found that stocking birds in the spring to increase production had no effect on subsequent fall densities; in fact, reproduction by native birds was actually depressed, possibly through adverse social interactions and crowding. There is virtual unanimous agreement among biologists who have researched the subject, that artificial propogation does not increase natural populations over large areas. This is not to say that local releases just before or during the hunting season won't contribute to hunter's bags. While such expensive, put-and-take operations cannot be justified on a state-wide basis, they might be undertaken by groups or individuals willing to tolerate the low returns and somewhat artificial shooting.

There is no question that predators play a role in the bobwhite's life history and that a combination of snow and inadequate protective cover increases all forms of mortality, including predation. Furthermore, in situations of isolated habitat, these losses can be substantial. Numerous food habits studies have shown that quail constitute no more than a very minor part of the diet of any one predatory species; however, bobwhites and their nests are preyed upon by a wide variety of birds, mammals, and even reptiles throughout the year. For this reason, attempts to control a specific predator would have little effect on the total predator community and even less on bobwhite losses.

With regard to season alteration, it is not necessary or advisable to close the bobwhite hunting season during population lows; although, I do advocate shortening the season during such times - perhaps a closing date of December 31. This position is based on several factors. First, it can be shown that hunting losses have a relatively greater effect on overall mortality when populations are low than when they are high.

Secondly, the later in the year that these losses occur, the less time is available for natural mechanisms (density-dependent adjustments in natural mortality) to compensate. Finally, late-season breakdown of natural vegetation makes quail more vulnerable to hunting and any harassment during periods of stressful environmental conditions may be undesirable.

Prospects for the Immediate Future

It is doubtful whether hunters will see much, if any, improvement next year, although there will be local variation. This pessimism is based on several factors: (1) certain adverse physiological effects of harsh environmental conditions may be carried over from one generation to the next (although genetic stock may be improved), (2) while not as severe as the previous two, last winter was nonetheless relatively harsh, (3) regional populations seem to be approaching a low as suggested by past evidence of a "9-10 year cycle", and (4) the spring 1979 breeding population will be too low for maximum production.

The current depression of bobwhite numbers in southern Illinois will not be permanent. Populations should begin to build, if not next year, than shortly thereafter barring further severe weather. Realistically, however, they cannot be expected to reach former levels of abundance simply because habitat conditions in most areas are less favorable now than a decade ago. For this reason, all of us concerned with Illinois' wildlife resources must make every effort to promote habitat restoration and discourage its unnecessary destruction.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1979-80

prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

W. D. Klimstra, Director

April 1, 1980

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Data are collected from the southern 34 counties of Illinois and separated into North and South regions (the latter includes Jackson, Williamson, Saline, Gallatin and all counties south). Weather information is collected from 30 stations throughout the entire area and analyzed on the basis of corresponding major life-history periods of the bobwhite.

Wing Analysis

Collection materials and requests for information were mailed to 192 quail hunters prior to the 1979 season; only 36 percent (69) submitted wings. The sex-age composition of the total sample of 2,383 is shown in Table 1. The North Region had a juvenile:adult ratio of 7.52:1, compared to the long-term mean of 5.55. In the South Region, 5.36 juveniles were harvested for every adult, compared to the long-term average of 4.37. As was the case last year, the higher-than-normal juvenile:adult ratios, coupled with generally

Table 1. Sex and age composition of 2,383 bobwhites harvested during the 1979 open season in southern Illinois.

Region	Males	Females	Unknown	Total	Percent
North					
Juveniles	477	471	15	963	88.27
Adults	81	45	2	128	11.73
Total	558	516	17	1,091	100.00
South					
Juveniles	532	557	0	1,089	84.29
Adults	126	77	0	203	15.71
Total	658	634	0	1,292	100.00
Entire Area					
Juveniles	1,009	1,028	15	2,052	86.11
Adults	207	122	2	331	13.89
Total	1,216	1,150	17	2,383	100.00

low fall populations, was thought to be indicative of a breeding population below carrying capacity as well as high adult summer mortality following nesting. Slightly less than one-half (49.5%) of the juveniles and about three-fifths (62.9%) of the adults were males. These sex ratios were considered to be within the normal range of variation. Backdating from date of kill indicated a rather late hatch as almost 37% of the juveniles harvested in 1979 were produced after July 29.

Hunter Questionnaire

Almost 60 percent (113) of the 192 hunters contacted returned their post-season cards, although not all hunted or answered every question. Hunters in the North Region reported taking 2,061 birds during 846 trips for an average of 2.44 birds per trip (Table 2). This rate of success was similar to the 2.40 recorded last year but still quite low compared to past years. In the South Region, cooperating hunters reported harvesting 1,949 quail in 559 trips. This success rate of 3.49 birds per trip was about 9 percent below that of last year. The weighted kill/trip index for the entire area (2.70) was the lowest since we began recording the statistic in 1960. Nevertheless, there was some indication that the downward trend of the past several years has slowed and possibly even reversed in some local areas. Twenty-six percent of the responding hunters felt the population in their particular area was up from last year, 14 percent thought it was about the same, and 60 percent said it was lower (Table 3). Most of those reporting some improvement hunted in the eastern portion of our southern Illinois study area. The overall relative abundance index was -3.43 (possible -10 to +10) compared to -8.04 last year.

Table 2. Harvest data as reported by cooperating hunters, southern Illinois, 1979 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	67	2,061	846	2.44
South	36	1,949	559	3.49
Total	103	4,010	1,405	2.85 (2.70)[1]

[1]Weighted (by area) mean

Table 3. Hunter opinions regarding quail population size in 1979 vs. 1978.

Region	More	Same	Less	Index[1]
North	18	9	42	-3.48
South	9	6	21	-3.33
Total	27	15	63	-3.43

[1]Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products and dividing by the total number of respondents.

Prospects for 1980

The past winter in southern Illinois was relatively mild and should have imposed no undue hardships on the birds. On one 1550-acre study area near Carbondale, we found the spring 1980 breeding population to be up 35 percent over last year but still below normal. Although populations cannot completely recover in one year, most hunters in southern Illinois should see a definite improvement next year - provided, of course, that they are able to hunt in areas of adequate habitat. In those regions where practices such as timber removal and fencerow clearing have destroyed the quail habitat, no amount of mild weather or reduced hunting will restore bobwhite populations to former abundance.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1980-81

prepared by

John L. Roseberry

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Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

W. D. Klimstra, Director

April 15, 1981

The Cooperative Wildlife Research Laboratory, SIU-C, has collected quail wings from southern Illinois each season since 1950. Age determination of these wings and analysis of accompanying information supplied by cooperating hunters provide indices of hatching chronology, sex-age composition, annual productivity, and current population status. The primary objectives of this research are to: (1) establish a long-term record of population performance to better identify and interpret current and future trends, (2) identify those environmental factors most responsible for annual variation in bobwhite productivity and hunter success, and (3) develop methods for predicting this variation prior to the hunting season to facilitate management decisions.

Data are collected from the southern 34 counties of Illinois and separated into North and South regions (the latter includes Jackson, Williamson, Saline, Gallatin and all counties south). Weather information is collected from 30 stations throughout the entire area and analyzed on the basis of corresponding major life-history periods of the bobwhite.

Wing Analysis

Collection materials and requests for information were mailed to 230 selected quail hunters prior to the 1980 season; 44 percent (102) submitted a total of 4,259 wings (Table 1). The North Region sample showed 8.42 juveniles per adult, considerably above the long-term mean of 5.62. In the South, 5.33 juveniles were taken per adult compared to the long-term average of 4.40. These higher-than-normal young:adult ratios are consistent with other evidence of a successful breeding season in 1980.

Males comprised 50.2 percent of the juveniles and 60.7 percent of the adults. These sex ratios were considered normal. The proportion of

juveniles hatched after July 29 (30%) and August 12 (19%) were also near normal; although, as indicated in an earlier report, these figures may underestimate the actual number of birds hatching after these dates.

Hunter Questionnaire

Fifty-five percent (126) of the 230 hunters contacted returned their post-season cards, although not all hunted or answered every question. Hunters in the North Region reported taking 3,716 quail in 1,169 trips for an average of 3.18 birds per trip (Table 2). This success rate was 30 percent above last year's figure but still below normal. In the South Region, cooperators reported bagging 2,573 quail during 719 trips. This success rate of 3.58 birds per trip was slightly higher than last year. The weighted kill per trip index for the entire region (3.28) was up 21 percent from 1979 but still below the long-term average.

Ninety-five (79%) of 121 respondents reported this year's population to be higher than last year (1979) while only 8 percent found fewer birds (Table 3). The overall trend index was +7.02 (possible -10 to +10).

Prospects for 1981

Last year's report concluded with the prediction that: "most hunters in southern Illinois should see a definite improvement [in 1980] . . ." The hunter success and opinion data in Tables 2 and 3 indicate that this was indeed the case in most areas. It is of interest that the extremely hot, dry summer weather of 1980 did not prevent a successful nesting season. This too agrees with our earlier findings that reproduction is more affected by weather the previous winter and spring than during the nesting season itself. Fortunately, we have just experienced a second consecutive mild

winter and recently-completed counts on our Carbondale Research Area showed a good breeding population. Therefore, the outlook for next fall is promising with population growth expected to continue in areas of adequate habitat.

Table 1. Sex and age of 4,259 bobwhites harvested during the 1980 open season in southern Illinois

Region	Males	Females	Total	Percent
North				
Juveniles	1,117	1,107	2,224	89.4
Adults	167	97	264	10.6
Total	1,284	1,204	2,488	100.0
South				
Juveniles	748	743	1,491	84.2
Adults	163	117	280	15.8
Total	911	860	1,771	100.0
Entire Area				
Juveniles	1,865	1,850	3,715	87.2
Adults	330	214	544	12.8
Total	2,195	2,064	4,259	100.0

Table 2. Harvest data as reported by cooperating hunters, southern Illinois, 1980 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	75	3,716	1,169	3.18
South	40	2,573	719	3.58
Total	115	6,289	1,888	3.33 (3.28)[1]

[1]Weighted (by area) mean.

Table 3. Hunter opinions regarding quail population size in 1980 vs. 1979.

Region	More	Same	Less	Index[1]
North	59	11	5	+7.20
South	36	5	5	+6.74
Total	95	16	10	+7.02

[1]Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products and dividing by the total number of respondents.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1981-82

prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

W. D. Klimstra, Director

April 15, 1982

The Cooperative Wildlife Research Laboratory, SIU-C, has collected quail wings from southern Illinois each season since 1950. This represents the longest, continuous data record ever acquired for a North American game bird. Age determination of the wings and analysis of accompanying information supplied by cooperating hunters provide indices of hatching chronology, sex-age composition, annual productivity, and current population status. The main objectives of this research are to: (1) establish a long-term record of population performance to better identify and interpret current and future trends, (2) determine which environmental factors are most responsible for annual variation in bobwhite productivity and hunter success, and (3) develop methods for predicting this variation prior to the hunting season to facilitate management decisions.

Data are collected from the southern 34 counties of Illinois and separated into North and South regions for comparison (the latter includes Jackson, Williamson, Saline, Gallatin and all counties south). Weather information is obtained from 30 recording stations throughout southern Illinois and analyzed according to major life-history periods of the bobwhite.

Wing Analysis

Collection materials and requests for information were mailed to 242 selected quail hunters prior to the 1981 season. One hundred and three hunters submitted a total of 4,693 wings. The North sample contained 5.48 juveniles per adult compared to 4.10 in the South (Table 1). The northern counties characteristically show a younger age ratio in autumn, probably reflecting a somewhat higher annual mortality rate. Both regional age ratios were slightly below their respective long-term means, but still indicative of a satisfactory reproductive situation. Backdating estimated ages from reported dates of

harvest showed that the 1981 hatching season was somewhat later than normal, especially in the South. This was probably related to the relatively cool summer temperatures which seemingly encourage prolonged nesting activities.

Hunter Questionnaire

Fifty-seven percent (139 of 242) of the hunters contacted returned their post-season cards, although not all hunted or answered every question. Hunters in the North Region reported taking 5,375 quail in 1,428 trips for an average of 3.76 birds per trip (Table 2). In the South Region, cooperators reported bagging 2,954 quail during 708 outings or 4.17 per trip. These hunter success ratios were up about 15 percent over last year in both regions, and very near the respective long-term averages. In agreement with this, 69 percent of the hunters judged the population to be up in their area compared to only 13 percent who felt there were fewer birds than in 1980 (Table 3). Many respondents commented that the birds were unusually wild. For reasons that we don't yet understand, this trait seems to be most often associated with rising populations.

Prospects for 1982

Quail populations in most parts of southern Illinois are clearly recovering from the weather-related low of a few years ago. Last winter was somewhat harsher than the previous two, especially in the North Region, and its effect on this comeback remains to be seen. Nevertheless, bobwhites should be at least as plentiful in 1982 as in 1981, and probably even more so where adequate habitat still exists. However, we must not become complacent regarding the future of quail in Illinois just because we are in a temporary upswing. The species will continue to face ever-increasing pressures due to habitat loss. Yet, even though we are only in the second year of recovery from a

devastating low, some hunters are already calling for an extension of the season. Others want it to begin and end later so that they will encounter better hunting conditions and fewer immature birds at the beginning of the season. This is understandable, though perhaps somewhat shortsighted. While it is true that healthy bobwhite populations are perfectly capable of sustaining an annual harvest year after year, it is not true that such populations are totally "unaffected" by hunting. Nor is it true that bobwhites are immune from overharvest, especially where habitat is "patchy" and local populations more or less isolated from one another. It is a fact though that quail are relatively less affected by early-season hunting than by losses which occur later in the winter. It should be obvious that the chances of a bird shot in January otherwise having survived to breed are greater than for a bird shot in early November. Furthermore, as temperatures and food supplies decline with advancing winter, coveys must spend more of their time foraging to obtain adequate nourishment. Hunting-related disturbance can disrupt this feeding and coveying behavior and place an additional burden of birds already struggling to cope with normal environmental stresses. Perhaps in this age of shrinking wildlife habitat, we should begin to think more in terms of what's best for the resource rather than just our own convenience. What we should all do to ensure continued quality bird hunting in Illinois is not to demand longer or later seasons, but to make every effort to promote habitat restoration and discourage its unnecessary destruction.

Table 1. Sex and age composition of 4,693 bobwhites harvested during the 1981 open season in southern Illinois.

Region	Males	Females	Unknown	Total	Percent
North					
Juveniles	1,170	1,089	27	2,286	84.57
Adults	253	162	2	417	15.43
Total	1,423	1,251	29	2,703	100.00
South					
Juveniles	807	789	4	1,600	80.40
Adults	218	172	0	390	19.60
Total	1,025	961	4	1,990	100.00
Entire Area					
Juveniles	1,977	1,878	31	3,886	82.80
Adults	471	334	2	807	17.20
Total	2,448	2,212	33	4,693	100.00

Table 2. Harvest data as reported by cooperating hunters, southern Illinois, 1981 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	82	5,375	1,428	3.76
South	38	2,954	708	4.17
Total	120	8,329	2,136	3.90 (3.86)[1]

[1] Weighted (by area) mean.

Table 3. Hunter opinions regarding quail population size in 1981 vs. 1980.

Region	More	Same	Less	Index[1]
North	60	14	9	+6.14
South	29	9	8	+4.57
Total	89	23	17	+5.58

[1] Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products, and dividing by the total number of respondents.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1982-1983

prepared by

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Southern Illinois University

Carbondale, Illinois

W. D. Klimstra, Director

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The Cooperative Wildlife Research Laboratory, SIU-C, has collected quail wings from southern Illinois each season since 1950. This represents the longest, continuous data record ever acquired for a North American game bird. Examination of the wings to determine age, and analysis of accompanying information supplied by cooperating hunters provide indices of dates of hatch, sex-age composition, reproductive success, and relative population size. The primary objectives of this research are to: (1) establish a long-term record of population performance to better identify and interpret current and future trends, (2) determine which environmental factors are most responsible for annual variation in bobwhite productivity and hunter success, and (3) develop methods for predicting this variation prior to the hunting season to facilitate management decisions.

Data are collected from the southern 34 counties of Illinois and separated into North and South regions for comparison (the latter includes Jackson, Williamson, Saline, Gallatin and all counties south). Weather information is obtained from 30 recording stations throughout southern Illinois and analyzed according to major life-history periods of the bobwhite.

Wing Analysis

Collection materials and requests for information were mailed to 222 selected quail hunters prior to the 1982 season. Eighty-seven (39%) of the hunters submitted a total of 4,430 wings. The North sample showed a young: adult ratio of 4.48:1 compared to 4.41:1 in the South (Table 1). These productivity indexes were considered normal for the Southern region but somewhat low for the Northern counties. Information presented later in this report will confirm that recruitment during the 1982 breeding season was not as good in the North region as in the South.

By backdating the estimated age of harvested birds from their reported date of kill, we can obtain an index of the timing of the hatch. These indices for both regions were very near their respective long-term means, suggesting that the 1982 hatching season was neither unusually early or late. This conflicts somewhat with the opinion of many South region hunters who reported encountering many young birds early in the season. The sex ratio of approximately 50 percent males among juveniles and 58 percent males among adults was considered normal.

Hunter Questionnaire

Fifty-five percent (122 of 222) of the hunters contacted returned their postseason questionnaire cards although not all hunted or answered every question. Hunters in the North Region reported harvesting 3,973 quail during 1,175 trips for an average success rate of 3.38 birds per trip (Table 2). In the South, hunters took 3,524 birds during 791 trips or 4.46 quail per outing. The North region success rate was down 10 percent from 1981 and was about 7 percent below the past 23-year average. In contrast, the kill/trip ratio in the South was up about 7 percent over last year and was also about 7 percent above the long-term average. These findings generally agree with our survey of hunter opinions. In the South, 73 percent of those responding thought that there were more birds in 1982 than in 1981. In contrast, only 30 percent of the North region hunters felt that the population was up over the previous year; 44 percent said it was about the same; and 26 percent said it was down (Table 3). Many hunters in both regions expressed the opinion that the season started too early.

Review of the Past Season and Prospects for 1983

As almost everyone remembers, quail abundance in southern Illinois reached an all-time low in 1979 following 3 consecutive severe winters. Numbers began to recover in 1980 and 1981 and the favorable trend continued last year in the South region. In the North however, (especially north of Interstate 64), the upswing appeared to have been temporarily halted. We believe that this reflects the relatively unfavorable winter of 1981-82 which was much more severe in our northern study counties.

The good news for quail hunters this year is that the past winter (1982-83) was one of the mildest on record, both in terms of moderate temperatures and lack of snow. Therefore, next year's crop of birds should be very good in those areas where adequate habitat still exists. Unfortunately, no amount of mild weather will restore bobwhites to former abundance in places where clean farming and timber clearing have destroyed their habitat.

Table 1. Sex and age composition of 4,430 bobwhites harvested during the 1982 open season in southern Illinois.

Region	Age	Males	Females	Total	Percent
North	Juveniles	1,015	985	2,000	81.77
	Adults	261	185	446	18.23
	Total	1,276	1,170	2,446	100.00
South	Juveniles	810	807	1,617	81.50
	Adults	214	153	367	18.50
	Total	1,024	960	1,984	100.00
Entire Area	Juveniles	1,825	1,792	3,617	81.65
	Adults	475	338	813	18.35
	Total	2,300	2,130	4,430	100.00

Table 2. Harvest data as reported by cooperating hunters, southern Illinois, 1982 season.

Region	Hunters	Total Harvest	Number of Trips	Kill per Trip
North	70	3,973	1,175	3.38
South	40	3,524	791	4.46
Total	110	7,497	1,966	3.81 (3.65)[1]

[1] Weighted (by area) mean

Table 3. Hunter opinions regarding numbers of bobwhites in 1982 vs. 1981.

Region	More	Same	Less	Index[1]
North	22	33	19	+0.41
South	33	12	1	+6.96
Total	55	45	20	+2.92

[1] Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products, and dividing by the total number of respondents.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1983-1984

prepared by

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W. D. Klimstra, Director

April 16, 1984

Each year since 1950, the Cooperative Wildlife Research Laboratory, SIU-C, has requested and received assistance from a selected group of quail hunters in the conduct of a long-term study of bobwhites in southern Illinois. Cooperators submit wings from harvested birds plus other information relating to their success and observations during the hunting season. Examination of the wings and analysis of accompanying information provide us with indices of sex-age composition, hatching dates, reproductive effort, and population trends. These biological parameters are then correlated with weather and other environmental conditions during critical periods of the bobwhite's annual cycle to better understand how these factors affect quail productivity and hunter success. The research has also established an invaluable long-term data base that aids in the interpretation of past, current, and future trends. In a related effort, our Laboratory recently completed an intensive, long-term study of a local bobwhite population in southern Illinois. The results and conclusions from this work are available in a book titled Population Ecology of the Bobwhite by John L. Roseberry and W. D. Klimstra, published by Southern Illinois University Press, Carbondale.

Analysis of Quail Wings

Collection materials and requests for information were mailed to 243 selected quail hunters prior to the 1983 season. Ninety-one (37%) of the hunters submitted a total of 3,520 wings. The ratio of juveniles to adult birds in the fall population was 3.62:1 in the North Region and 3.28:1 in the South (Table 1). These ratios are well below the long-term averages for both regions, and the overall figure of 77.4 percent young in the fall population was the second lowest since 1950. Without doubt, relative recruitment on a per hen basis was low during the 1983 breeding season. However, because there was a

good carryover of breeders from the mild 1982-83 winter, total production was sufficient to produce a reasonably high autumn population. Several factors may have contributed to the below-normal reproduction experienced last summer: (1) it is common for individual production to be lower during years when there are a large number of breeders in relation to available habitat, and (2) the extremely hot, dry summer of 1983 was not conducive to maximum reproduction.

The proportion of males in the population (51% among juveniles, 60% among adults) was slightly higher than in 1982, but still considered normal. Bobwhites hatch at about a 50:50 sex ratio; but females suffer slightly higher losses thereafter, especially during and after the breeding season. Therefore, there is normally a preponderance of males in the adult segment of the population but nearly equal representation among young-of-the-year.

Backdating estimated ages of wings from reported kill dates showed a higher-than-average proportion of late-hatched birds in the 1983 fall sample. This is somewhat surprising because hot, dry conditions normally curtail late nesting. However, the age distribution of juveniles in autumn can reflect both the timing of chick losses as well as nesting chronology the previous summer. When coupled with evidence of below-normal reproduction, the occurrence of late-hatched birds in autumn may not indicate good late nesting so much as poor survival of early nests and/or chicks. Some might be inclined to blame this on the heavy rains we experienced last March and April and early May. However, peak egg laying of bobwhites occurs from mid-May through mid-July and early spring rains before this generally favor good reproduction, although this was not the case last year.

Hunter Success and Opinions

Only 43 percent (105/243) of the hunters contacted returned their postseason questionnaire cards. Cooperators from the North Region reported

harvesting 2,773 quail during 842 trips for a success rate of 3.29 birds per trip (Table 2). Hunters in the South Region took 2,146 birds during 548 trips, or 3.92 quail per outing. Success rates for both groups were down somewhat from last year, and about 5-9 percent below their respective long-term averages. However, this may have been due in part to inclement weather during the latter half of the 1983 hunting season. In fact, the general consensus among hunters in both regions was that the 1983 quail population was higher than that of 1982 (Table 3).

As in the past, many hunters expressed the opinion that the season starts and ends too early. Understandably, hunters do not like to work their dogs during hot, dry conditions, nor do they like to encounter immature birds. However, there must be some compromise between what is convenient for the hunter and what is best for the resource. There are at least three reasons why a reasonably early season is biologically preferable for the species being hunted: (1) the earlier the season, the more birds available to harvest; (2) the earlier that hunting losses occur, the less additive they are to natural mortality. In other words, the chances of a bird shot in mid-January otherwise surviving to breed are much greater than for a bird shot in early November; (3) flushing by dogs and hunters can disrupt normal daily activity patterns of bobwhites, including feeding. When such disturbance occurs during already stressful times such as prolonged cold or snow cover, both survival and breeding potential of the birds can be jeopardized.

Prospects for the Future

Bobwhites exhibit two types of population changes: short-term fluctuations caused by weather and possibly cyclic influences, and long-term trends related to the quantity and quality of available habitat. To put it another way, quail can be expected to periodically fluctuate between relative abundance and

scarcity for reasons over which we have little or no control. On the other hand, the base or limits within which these fluctuations occur is determined by how we use the land. In Illinois, as in other midwestern states, continued destruction of upland wildlife habitat has precipitated a substantial decline in bobwhite abundance over the past 25-30 years. The temporary upswing in quail numbers over the past few years can be expected to level off in the near future. Just when the next low will come, and how severe it will be, depends to some extent on the kinds of winters during the remainder of the decade. In the past, Illinois quail populations have generally been able to recover from lows within 3-4 years. However, as habitat destruction and fragmentation create more and more isolated or "island" populations, we may begin to see situations in which local areas do not recover, or recover very slowly. Small, isolated populations can be more or less permanently held down by mortality factors which normally pose no serious problem for viable, well-situated coveys with access to continuous quality habitat. To ensure the future of quail in Illinois, we must encourage the retention and development of wildlife habitat and discourage its unnecessary destruction at every opportunity.

Table 1. Sex and age composition of 3,520 bobwhites harvested during the 1983 open season in southern Illinois.

Region	Age	Males	Females	Unknown	Total	Percent
North[1]	Juvenile	621	641	2	1,264	78.36
	Adult	209	140	0	349	21.64
	Total	830	781	2	1,613	100.00
South[2]	Juvenile	765	668	28	1,461	76.26
	Adult	260	177	9	446	23.74
	Total	1,025	845	37	1,879	100.00
Entire Area	Juvenile	1,386	1,309	30	2,725	77.41
	Adult	469	317	9	795	22.59
	Total	1,855	1,626	39	3,520	100.00

[1]Madison, Bond, Fayette, Effingham, Jasper, Crawford, St. Clair, Clinton, Washington, Marion, Jefferson, Clay, Wayne, Richland, Edwards, Lawrence, Wabash, Monroe, Randolph, Perry, Franklin, Hamilton, and White counties.

[2]Jackson, Williamson, Saline, Gallatin, Union, Johnson, Pope, Hardin, Alexander, Pulaski, and Massac counties.

Table 2. Harvest data as reported by cooperating hunters, southern Illinois, 1983 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	62	2,773	842	3.29
South	36	2,146	548	3.92
Total	98	4,919	1,390	3.54 (3.45)[1]

[1]Weighted average (by area)

Table 3. Hunter opinions regarding quail abundance in 1983 vs. 1982.

Region	More	Same	Less	Index[1]
North	36	19	9	+4.22
South	20	15	4	+4.10
Total	56	34	13	+4.17

[1]Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products, and dividing by the total number of respondents.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1984-1985

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May 1, 1985

Each year since 1950, the Cooperative Wildlife Research Laboratory, SIU-C, solicits the help of a select group of quail hunters in the conduct of a long-term study of bobwhites in southern Illinois. Cooperators are asked to submit wings from harvested birds and to provide information relating to their success and observations during the hunting season. Examination of the wings and analysis of accompanying information provide valuable indices of sex-age composition, hatching dates, reproductive effort, and population trends. These biological parameters are compared with weather and other environmental conditions to assess the factors affecting quail productivity and hunter success. The research has established an invaluable long-term data base that aids in the interpretation of past, current, and future trends in bobwhite abundance.

Analysis of Quail Wings

Collection materials and requests for information were mailed to 237 selected quail hunters prior to the 1984 season. Thirty-three percent (78) of the hunters contacted submitted a total of 2,630 wings. The ratio of juvenile to adult birds was 4.34:1 in the North Region and 3.41:1 in the South (Table 1). The representation of young-of-the-year birds in the fall population was below the long-term average in both regions, indicating that reproduction during the summer of 1984 was not particularly good.

The sex ratio among juveniles (49 percent males) and among adults (63 percent males) was within the range of normal variation. Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher losses thereafter, especially during and after the breeding season. Therefore, there is normally a preponderance of males in the adult segment of the population, but nearly equal representation among juveniles.

Backdating the estimated ages of wings from their respective dates of harvest showed an unusually high proportion of late-hatched quail in the fall 1984 population. Reasons for this are not entirely clear at this time, but may become evident after all of the environmental factors have been fully analyzed.

Hunter Success and Opinions

Slightly less than one-half (114/237) of the hunters contacted returned their postseason questionnaire cards. Hunters in the South Region reported harvesting 2,764 quail during 826 trips for a success rate of 3.35 birds per trip (Table 2). In the North, hunters took 2,457 birds during 891 trips, or 2.76 quail per outing. Success rates in both regions were down about 15 percent from the previous year. In agreement with this finding, the majority of hunters (52% in the North and 73% in the South) expressed the opinion that there were fewer birds in 1984 than in 1983 (Table 3). Virtually all of the hunters commented on the relatively poor hunting conditions during the past season, due primarily to wet weather and the large amounts of standing crops left in the fields. This latter condition, which made birds more difficult to locate, must be taken into account when relating hunter success to overall population levels. In our opinion, the 1984 population was down from 1983, but perhaps not as much as the data in Tables 2 and 3 would indicate.

Prospects for Next Year

The prevailing level of quail abundance characteristic of a particular area is determined primarily by habitat conditions. As we all know, unfavorable land use and agricultural practices over the past several decades have resulted in a progressive decline in the quantity and

quality of habitat, and a corresponding reduction in numbers of quail and rabbits. Within the limits established by habitat, however, quail numbers exhibit periodic ups and downs due primarily to weather and possibly cycles. One characteristic of these short-term fluctuations is that individual phases (highs, lows, increases, declines) each tend to last for several years. With regard to the current situation in southern Illinois, there is evidence that the temporary upswing begun around 1981 has leveled off and the population may have started back down. Therefore, we anticipate that the 1985 quail crop will be similar to or somewhat lower than 1984.

Table 1. Sex and age composition of 2,630 bobwhites harvested during the 1984 open season in southern Illinois.

Region	Age	Males	Females	Unknown	Total	Percent
North[1]	Juvenile	548	600	3	1,151	81.29
	Adult	165	97	3	265	18.71
	Total	713	697	6	1,416	100.00
South[2]	Juvenile	411	395	133	939	77.35
	Adult	152	90	33	275	22.65
	Total	563	485	166	1,214	100.00
Entire Area	Juvenile	959	995	136	2.090	79.47
	Adult	317	187	36	540	20.53
	Total	1,276	1,182	172	2,630	100.00

1 Madison, Bond, Fayette, Effingham, Jasper, Crawford, St. Clair, Clinton, Washington, Marion, Jefferson, Clay, Wayne, Richland, Edwards, Lawrence, Wabash, Monroe, Randolph, Perry, Franklin, Hamilton, and White counties.

2 Jackson, Williamson, Saline, Gallatin, Union, Johnson, Pope, Hardin, Alexander, Pulaski, and Massac counties.

Table 2. Harvest data as reported by cooperating hunters, southern Illinois, 1984 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	59	2,457	891	2.76
South	43	2,764	826	3.35
Total	102	5,221	1,717	3.04 (2.91)[1]

1 Weighted average (by area)

Table 3. Hunter opinions regarding quail abundance in 1984 vs. 1983.

Region	More	Same	Less	Index[1]
North	10	20	33	-3.65
South	4	8	33	-6.44
Total	14	28	66	-4.81

1 Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products, and dividing by the total number of respondents.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1985-1986

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John L. Roseberry

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Carbondale, Illinois

W. D. Klimstra, Director

May 1, 1986

Each year since 1950, the Cooperative Wildlife Research Laboratory, SIU-C solicits the help of a select group of quail hunters in the conduct of a long-term study of bobwhites in southern Illinois. Cooperators are asked to submit wings from harvested birds and to provide information relating to their success and observations during the hunting season. Examination of the wings and analysis of accompanying hunt records provide valuable information regarding sex-age composition, hatching dates, reproductive performance, and population trends. These biological parameters are compared with weather and other environmental conditions to evaluate factors affecting quail productivity and hunter success. This research has established an invaluable long-term data base that aids in the interpretation of past, current, and future trends in bobwhite abundance.

Analysis of Quail Wings

Collection materials and requests for information were mailed to 258 selected quail hunters prior to the 1985 season. Thirty-nine percent (101) of the hunters contacted submitted a total of 5,246 wings. The juvenile:adult ratio was 4.92:1 in the North Region and 4.48:1 in the South (Table 1). This representation of young-of-the-year birds in the fall population was near the long-term average for both areas.

The sex ratio among juveniles (50.7% males) and adults (62.8% males) was also within the range of normal variation. Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher mortality thereafter, especially during and after the breeding season. For this reason hunters normally see about equal numbers of males and females among young birds, but a preponderance of males among adults.

Backdating the estimated ages of quail (based on wing molt) from their harvest date indicated the hatch was again rather late this year, but not as late as in 1984.

Hunter Success and Opinions

Just over half (131/258) of the hunters contacted returned their postseason questionnaire cards. In the southern section of our study area, hunters reported taking 3,106 quail during 979 trips for a success rate of 3.17 birds per trip (Table 2). In the northern counties, hunters took 5,043 birds during 1,441 trips, or 3.50 quail per outing. This represents the first time since 1962 that hunter success has been higher in the North than in the South portion of the study area. There were also marked regional differences in population trends. The North Region hunter success rate for 1985 was 27 percent higher than the year before and over two-thirds of the hunters felt that the population was up from the previous year (Table 3). Many hunters, in fact, thought it was the best in several years. In contrast, hunter success in the South Region was down 5 percent from the previous year and almost 60 percent of the hunters agreed that the population was lower in 1985 than in 1984. This was especially evident in Johnson, Pope, Hardin, and Massac counties; populations in the remaining counties of the South Region were apparently more normal. One factor that may have contributed to this differential was the preceding winter. Normally, southern Illinois winters are harsher in the northern portions of the study area. However, snow cover during the winter of 1984-85 actually persisted longer in the South than in the North region, and in terms of what is normal for each area, it was 2.3 times more severe.

Fortunately, this past winter was more favorable, both in terms of moderate temperatures and absence of extended periods of snow cover. As several hunters mentioned, there appeared to be a good carryover of birds going into the breeding season and next year's populations should be reasonably good in those areas where adequate habitat still exists.

Table 1. Sex and age composition of 5,246 bobwhite harvested during the 1985 open season in southern Illinois.

Region	Age	Males	Females	Unknown	Total	Percent
North[1]	Juvenile	1,478	1,432	41	2,951	83.10
	Adult	377	217	6	600	16.90
	Total	1,855	1,649	47	3,551	100.00
South[2]	Juvenile	657	647	82	1,386	81.77
	Adult	181	113	15	309	18.23
	Total	838	760	97	1,695	100.00
Entire Area	Juvenile	2,135	2,079	123	4,337	82.67
	Adult	558	330	21	909	17.33
	Total	2,693	2,409	144	5,246	100.00

[1] Madison, Bond, Fayette, Effingham, Jasper, Crawford, St. Clair, Clinton Washington, Marion, Jefferson, Clay, Wayne, Richland, Edwards, Lawrence, Wabash, Monroe, Randolph, Perry, Franklin, Hamilton, and White counties.

[2] Jackson, Williamson, Saline, Gallatin, Union, Johnson, Pope, Hardin, Alexander, Pulaski, and Massac counties.

Table 2. Harvest data as reported by cooperating hunters, southern Illinois 1985 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	79	5,043	1,441	3.50
South	42	3,106	979	3.17
Total	121	8,149	2,420	3.37 (3.42)[1]

[1]Weighted average (by area).

Table 3. Hunter opinions regarding quail abundance in 1985 vs. 1984.

Region	More	Same	Less	Index[1]
North	56	18	8	+5.85
South	9	10	27	-3.91
Total	65	28	35	+2.34

[1]Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products, and dividing by the total number of respondents.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1986-1987

Prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

W. D. Klimstra, Director

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The Cooperative Wildlife Research Laboratory, SIU-C, with the aid of a select group of quail hunters, annually monitors the status and performance of bobwhite populations throughout southern Illinois. Cooperating hunters are asked to submit wings from harvested birds and to keep records of their hunting trips and observations. Examination of the wings and analysis of accompanying hunt records provide our Laboratory with valuable data on sex-age composition, hatching dates, reproductive performance, and population trends. This biological information, along with weather and environmental variables, has been recorded annually since 1950 and represents the longest, continuous dataset ever obtained for a North American game bird. Long-term records of this type are especially valuable in that they permit the interpretation of past, current, and future trends. Data are collected from the southermost 34 counties of the State. For purposes of analysis, this area is separated into North and South regions, the latter includes Jackson, Williamson, Saline, Gallatin and all counties south. The North region includes all counties to the north up to and including Madison, Bond, Fayette, Effingham, Jasper, and Crawford.

Analysis of Quail Wings

Juvenile bobwhites (birds hatched the previous summer) can be distinguished from adults based on the appearance of certain wing feathers (primary coverts). The age of juveniles in days can be further estimated based on progression of molt of another set of wing feathers (primaries). The ratio of juvenile to adult birds in the fall population gives an indication of the relative success of the previous breeding season. Timing of the hatch can also be estimated by backdating the age of individual juveniles from their date of harvest.

Collection materials and requests for information were mailed to 259 selected quail hunters prior to the 1986 season. Thirty-nine percent (101) of the hunters contacted submitted a total of 5,913 wings (Table 1). This represents the largest sample of wings received by our Laboratory since collections were begun in 1950. The juvenile:adult ratio in the North was 4.86:1 compared to 3.90:1 in the South. These figures are about 8-11% below their respective long-term means for each region. This suggests that the relatively high numbers of quail present in many areas last fall were due more to a large breeding population in 1986 than to above-average reproduction per individual hen. The fact that young:old ratios are typically higher in the northern than in the southern part of the study area probably reflects higher fall-spring mortality rates there compared to the southern counties. In other words, reproduction may average somewhat higher in the North to compensate for higher mortality.

The sex ratio among young birds (50% males) and adults (58% males) was within the range of normal variation. Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher mortality thereafter, especially during and after the breeding season. For this reason, hunters normally see about equal numbers of males and females among young birds but a preponderance of males among adults.

The hatching season was just slightly later than average for both regions but again, well within the range of normal variation.

Hunter Success and Opinions

One half (129/259) of the hunters contacted returned their postseason questionnaire cards last year. Those in the North region reported taking 7,133 quail during 1,722 trips for an average success rate

of 4.14 birds per outing (Table 2). South region hunters harvested 3,534 birds during 907 trips or 3.90 quail per hunt. Success rates for both regions were about 20% above 1985 figures, indicating a considerable increase in number of birds available and/or hunting conditions. In agreement with these statistics, 74% of the North region hunters felt there were more birds this year than last as did 67% of the hunters in the South region (Table 3). In fact, many of the North region hunters said it was their best season in years and one called it "a season like every hunter dreams about." Most credited the good year to several recent mild winters, an increase in habitat associated with farmland set-aside programs, and generally favorable conditions during the hunting season.

This past winter was also relatively mild, which bodes well for the 1987 bird crop. However, we can't count on these to continue indefinitely. The real answer to good quail numbers year after year is adequate, stable habitat conditions. Because of the 1985 Farm Bill, present opportunities for upland habitat restoration are better than they've been in years. However, all land-use practices that satisfy requirements do not necessarily benefit quail. Each of you should urge farmers in your area to seek the advice of Department of Conservation biologists in establishing plans for their retired acres that would provide maximum benefits for upland wildlife.

Table 1. Sex and age composition of 5,913 bobwhite harvested during the 1986 open season in southern Illinois.

Region	Age	Males	Females	Unknown	Total	Percent
North[1]	Juvenile	1,629	1,651	6	3,286	82.94
	Adult	392	284	0	676	17.06
	Total	2,021	1,935	6	3,962	100.00
South[2]	Juvenile	722	733	98	1,553	79.60
	Adult	220	154	24	398	20.40
	Total	942	887	122	1,951	100.00
Entire Area	Juvenile	2,351	2,384	104	4,839	81.84
	Adult	612	438	24	1,074	18.16
	Total	2,963	2,822	128	5,913	100.00

[1] Madison, Bond, Fayette, Effingham, Jasper, Crawford, St. Clair, Clinton, Washington, Marion, Jefferson, Clay, Wayne, Richland, Edwards, Lawrence, Wabash, Monroe, Randolph, Perry, Franklin, Hamilton, and White counties.

[2] Jackson, Williamson, Saline, Gallatin, Union, Johnson, Pope, Hardin, Alexander, Pulaski, and Massac counties.

Table 2. Harvest data as reported by cooperating hunters, southern Illinois, 1986 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	77	7,133	1,722	4.14
South	41	3,534	907	3.90
Total	118	10,667	2,629	4.06 (4.08)[1]

[1] Weighted average (by area).

Table 3. Hunter opinions regarding quail abundance, 1986 vs. 1985.

Region	More	Same	Less	Index[1]
North	60	18	3	+7.04
South	28	6	8	+4.76
Total	88	24	11	+6.26

[1] Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products, and dividing by the total number of respondents.

STATUS OF BOBWHITE POPULATIONS

IN SOUTHERN ILLINOIS

1987-1988

Prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

Alan Woolf, Director

May 15, 1988

The Cooperative Wildlife Research Laboratory, SIU-C, with the aid of a select group of quail hunters, annually monitors the status and performance of bobwhite populations throughout southern Illinois. Cooperating hunters are asked to submit wings from harvested birds and to keep records of their hunting success. Examination of the wings and analysis of accompanying hunt records provides valuable data on sex-age composition of the harvest, hatching dates and reproductive success the previous summer, and overall population trends. This biological information is then correlated with weather and land use variables to get a better picture of how bobwhite populations are affected by changing environmental conditions as well as routine weather fluctuations. This data set was begun in 1950 and represents the longest continuous such record ever compiled for a North American game bird. Long-term studies of this type are especially valuable in that they provide historical perspective for interpreting current events and facilitate the prediction of future trends.

Data are collected from the southern 34 counties of Illinois. For purposes of analysis, these counties are combined into a North and a South Region. The latter includes Jackson, Williamson, Saline, Gallatin and all counties south. The North region includes all counties to the north up to and including Madison, Bond, Fayette, Effingham, Jasper and Crawford.

Analysis of Quail Wings

Juvenile bobwhites (birds hatched the previous summer) can be distinguished from adults (birds that have gone through at least 1 breeding season) based on the appearance of certain wing feathers (primary coverts). The age of juveniles can be estimated to the nearest day based on progression of molt of another set of wing feathers (primaries). The ratio of juvenile to adult birds in the fall population is an indication of the relative success of

the previous breeding season. Timing of the hatch can also be estimated by backdating the age of individual juveniles from the date of their kill.

Collection materials and requests for information were mailed to 199 selected quail hunters prior to the 1987 season. Forty-four percent (88) of the hunters contacted submitted a total of 4,409 wings (Table 1). The juveniles/adult ratio was 4.35 in the North and 3.16 in the South. These young/adult ratios were about 20-25 percent below their respective long-term averages and 10-20 percent below last year's figures. Reproductive success on a per hen basis is often relatively low during years of high breeding densities such as we had last spring. However, the important thing in terms of subsequent fall abundance is total production.

The sex ratio among young birds (52% males) and adults (62% males) was within the range of normal variation. Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher mortality thereafter, especially during and after the breeding season. For this reason, hunters normally see about equal numbers of males and females among young birds but a preponderance of males among adults.

There appeared to be fewer late-hatched birds in the regional samples than normal. This is often the case when late summer weather is relatively hot and dry as it was last year.

Hunter Success and Opinions

About 53% (105/199) of the hunters returned their postseason questionnaires. Cooperators in the North region reported taking 5,048 quail during 1,280 trips for an average success rate of 3.94 birds per outing. Hunters in the South region harvested 2,202 quail during 627 trips or 3.51 birds/hunt (Table 2). These regional success rates were about 5-10% below those recorded for the 1986-87 season, indicating that in most parts of

southern Illinois, the 1987 quail crop was similar to or slightly smaller than the previous year.

This generally agrees with the consensus among individual hunters. Overall, 30% said quail numbers were up from the previous year, 35% said they were down, and 35% thought they were about the same (Table 3).

General Outlook

Thanks to a series of mild winters, bobwhite populations in southern Illinois continued to be relatively high last year, at least where suitable habitat existed. This past winter was also mild, which is always good news for bird hunters. However, we cannot count on favorable weather to continue indefinitely. The real answer to long-term quail abundance is an adequate, stable habitat base. The 1985 Food Security Act (Farm Bill) provides for several conservation initiatives that have the potential to at least partially restore some of the upland wildlife habitat lost over the last several decades. To date, approximately 171,000 acres have been enrolled in the long-term Conservation Reserve Program. On a regional basis, this amounts to about 8% of the eligible acreage in the North and 21% in the South. Concerned sportsmen would do well to encourage farmers in their area to retire as much acreage as possible, not only to conserve valuable topsoil, but to provide much-needed wildlife habitat as well. However, all conservation practices that satisfy program requirements do not necessarily benefit quail, nor are habitat deficiencies the same in all areas. Bobwhites require a variety of vegetative types to meet their daily and seasonal needs, and populations will be limited by the habitat component most lacking in a particular area. For example, one farm might be lacking nesting habitat while another might not have enough escape cover or provide enough late-winter food. Decisions as to the particular conservation practice would be most beneficial to quail should

be made on an area-by-area basis, depending on what habitat component is most lacking. Illinois Department of Conservation biologists can advise individual landowners and sportsmen's groups as to the recommended practice for any given situation.

Table 1. Sex and age of 4,409 bobwhites harvested during the 1987 open season in southern Illinois.

Region	Age	Males	Females	Total	Percent
North	Juvenile	1,331	1,246	2,577	81.32
	Adult	359	233	592	18.68
	Total	1,691	1,479	3,169	100.00
South	Juvenile	494	448	942	75.97
	Adult	189	109	298	24.03
	Total	683	557	1,240	100.00
Entire Area	Juvenile	1,825	1,694	3,519	79.81
	Adult	548	342	890	20.19
	Total	2,373	2,036	4,409	100.00

Table 2. Reported hunter success in southern Illinois, 1987 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	64	5,048	1,280	3.94
South	33	2,202	627	3.51
Total	97	7,250	1,907	3.80 (3.83)[1]

[1]Weighted average (by area)

Table 3. Hunter opinions regarding quail abundance, 1987 vs 1986.

Region	More	Same	Less	Index[1]
North	24	22	23	+0.14
South	7	15	13	-1.71
Total	31	37	36	-0.48

[1] Index obtained by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products, and dividing by the total number of respondents.

STATUS OF BOBWHITE POPULATIONS IN SOUTHERN ILLINOIS 1988-1989

Prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

Alan Woolf, Director

May 15, 1989

The Cooperative Wildlife Research Laboratory, SIU-C, with the aid of a select group of quail hunters, annually monitors the status of bobwhite populations throughout southern Illinois. Cooperating hunters are asked to contribute wings from harvested birds and to keep records of their hunting trips. Examination of the wings and analysis of hunt records provide valuable information on sex-age composition of the harvest, hatching dates, reproductive performance, and overall population trends. These biological data are then correlated with weather and land use variables to better understand how bobwhite populations are affected by changing environmental conditions as well as routine weather fluctuations. This investigation was begun in 1950 and represents the longest continuous record ever compiled for a North American game bird. Long-term studies of this type are valuable in that they provide historical perspective for interpreting past and current conditions, as well as predicting future trends.

Data are collected from the southern 34 counties of Illinois. For purposes of analysis, these counties are combined into Northern and Southern regions. The latter includes Jackson, Williamson, Saline, Gallatin and all counties south. The North region includes all counties to the north up to and including Madison, Bond, Fayette, Effingham, Jasper, and Crawford.

Analysis of Quail Wings

Juvenile bobwhites (birds hatched the previous summer) can be distinguished from adults (birds that have gone through at least 1 breeding season) based on appearance of certain wing feathers (primary coverts). The age of juveniles can be estimated to the nearest day based on progression of molt of another set of wing feathers (primaries). The ratio of juvenile to adult birds in the fall population gives an indication of the relative

success of the previous breeding season. Timing of the hatch can also be estimated by backdating the age of individual juveniles from the date of their kill.

Collection materials and requests for information were mailed to 211 selected quail hunters prior to the 1988 season. About 43% (91) of this group submitted a total of 4,410 wings (Table 1). The juvenile/adult ratio was 3.44:1 in the North region and 3.47:1 in the South; both figures were below their respective long-term averages.

Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher mortality thereafter, especially during and after the breeding season. For this reason, hunters normally see about equal numbers of males and females among young birds but a preponderance of males among adults. The sex ratio among young birds (51% males) was typical of most years, but representation of males among adult birds (56%) was slightly below normal. The hatching season, as measured by the percentage of young hatching after July 29 appeared normal.

Hunter Success and Opinions

About 57% (120/211) of the hunters contacted returned their postseason questionnaire cards although not all answered every question. Hunters in the North region reported taking 4,907 birds during 1,394 trips for a success rate of 3.52 quail/trip (Table 2). Hunters in the South region harvested 1,878 bobwhites in 642 outings or 2.93/trip. Hunting success in both regions was below average. In agreement with this, over 72% of the hunters responding thought that the population was down from the previous year, while only 10% said there were more birds (Table 3).

The 1988 Drought

The big story of 1988 was the severe drought that occurred over much of the United States. Sportsmen and biologists alike were very interested in how this condition affected bobwhite populations. Normally, bobwhites in the Midwest are most affected by winter weather, especially duration of snowcover. However, summer conditions, especially drought, can also be occasionally harmful. In particular, the summers of 1930, 1934, 1936, 1952, and 1953 were known to have adversely affected Midwestern bobwhite populations. We were particularly interested in determining how severe the 1988 drought was in relation to these historic ones, and what, if any, affect it had on bobwhite abundance during the 1988 season.

Fortunately, our long-term wing study provided an excellent background of data with which to assess the current situation. In addition, we went back to the old weather records and obtained daily precipitation and temperature data for the years 1930, 1934, 1936 so that we could compare them with conditions in 1988.

Last year started out rather normal. Cumulative precipitation for the 3-month period January-March was above normal throughout southern Illinois. The months of April, May, and June, however, were extremely dry. Accumulated precipitation deficit for the 3-month period ending 30 June was approximately 60%. The drought was partially broken the 2nd week in July and precipitation for the month was slightly above average for the area as a whole. As is common in summer, there was considerable local variation. For example, Carmi in White County received 10.9" of rainfall while Dixon Springs in Pope County recorded only 1.5". Generally dry conditions returned in August with rainfall over most of the area only about 55% of normal. As it turned out, the primary bobwhite egg laying season (21 April

- 18 August) in 1988 was the driest recorded during our 39-year study, while the hatching season (10 June - 28 August) was the 7th driest. Neither, however, was as dry as comparable periods in 1930 or 1936 which by all accounts, were the 2 most severe summer droughts in recorded Illinois weather history (1878-1988). Last year's egg-laying season was, however, drier than comparable periods in 1934, 1952, and 1953, while the hatching season was drier than 1934 and similar to 1952 (Fig. 1).

Temperatures last summer were above normal, but were not as extreme as the during droughts in the 1930's. For example, the average number of days with maximum daily temperature over 100°F last summer was 9 compared to 23 in 1930, 18 in 1934, and 36 in 1936.

What affect then did the 1988 drought have on bobwhites in southern Illinois? First off, it seemed clear that bobwhite reproduction was adversely affected. The combined juvenile/adult ratio for both regions was 32% below normal and was the 3rd lowest recorded since 1950. Extreme drought conditions are known to reduce the hatchability of eggs and the survival of chicks. That this occurred last summer is evidenced by the fact that many of the fall coveys contained fewer birds than normal. As is typical following a poor reproductive season, fall populations were also down last year. Over 72% of the hunters said there were fewer birds in their area than in 1987 and the combined hunter opinion index of -6.2 was the 5th lowest recorded in the past 37 years. Nevertheless, the past season was not a disaster; there were still birds to be found. The reasons why the 1988 quail population was not affected even more by the severe drought was probably due to several factors: 1) last season started with a large breeding population in good physical shape following the previous mild winter, 2) July rains provided some relief for nesting birds, and 3) even

though temperatures were above average, they were not extreme when compared to some severe drought years in the past.

The Outlook

Fortunately, we had a relatively mild winter again this year, and that's always good news for quail and quail hunters. Significant as they can be, however, weather-related ups and downs represent only temporary fluctuations. The real answer to long-term quail abundance is an adequate, stable habitat base. The 1985 Food Security Act (Farm Bill) provides for several conservation programs that have the potential to at least partially restore some of the upland wildlife habitat that has been lost over the past several decades. Concerned sportsmen should encourage farmers in their area to retire as much acreage as possible, not only to conserve valuable topsoil, but to provide much-needed wildlife habitat as well. However, all conservation practices that satisfy program requirements do not necessarily benefit quail, nor are habitat deficiencies the same in all areas. Bobwhites require a variety of vegetative types to meet their daily and seasonal needs, and populations in any given area will be limited by the habitat component that is most lacking. For example, one farm might have insufficient nesting and brood-rearing cover while another might not offer enough heavy escape cover or provide enough late-winter food. Decisions as to the particular conservation practice that would be most beneficial to quail should be made on an area-by-area basis, depending on what habitat component is most lacking. Illinois Department of Conservation biologists can advise individual landowners and sportsmen's groups as to the recommended practice for any given situation.

Table 1. Sex and age of 4,410 bobwhites harvested during the 1988-89 open season in southern Illinois.

Region	Age	Males	Females	Unknown	Total	Percent
North	Juvenile	1,176	1,105	0	2,281	77.48
	Adult	367	292	4	663	22.52
	Total	1,543	1,397	4	2,944	100.00
South	Juvenile	550	539	49	1,138	77.63
	Adult	189	124	15	328	22.37
	Total	739	663	64	1,466	100.00
Entire Area	Juvenile	1,726	1,644	49	3,419	77.53
	Adult	556	416	19	991	22.47
	Total	2,282	2,060	68	4,410	100.00

Table 2. Reported hunter success in southern Illinois, 1988-89 season.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
North	74	4,907	1,394	3.52
South	30	1,878	642	2.93
Total	104	6,785	2,036	3.33 (3.37)[1]

[1]Weighted average (by area)

Table 3. Hunter opinions regarding quail abundance, 1988 vs 1987.

Region	More	Same	Less	Index[1]
North	9	15	52	-5.66
South	3	5	32	-7.25
Total	12	20	84	-6.21

[1]Index computed by multiplying the number of "mores" by +10, the number of "lesses" by -10, summing their products, and dividing by the total number of respondents.

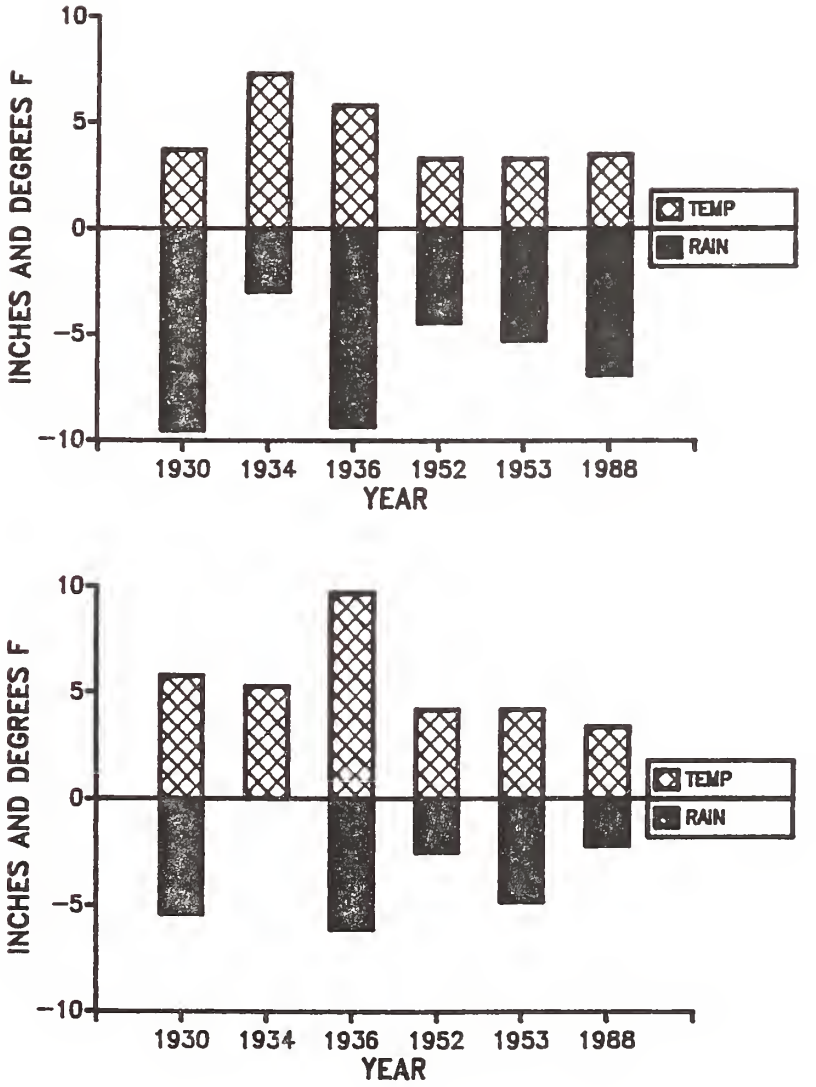

Figure 1. Mean maximum daily temperature and precipitation deviation from normal (1959-1987) for bobwhite nesting season, 21 April - 18 August (top), and hatching season, 10 June - 28 August (bottom).

STATUS OF BOBWHITE POPULATIONS

ILLINOIS

1989-1990

Prepared by

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Carbondale, Illinois

Dr. Alan Woolf, Director

May 15, 1990

The Cooperative Wildlife Research Laboratory, SIU-C, with the aid of a select group of quail hunters, annually monitors the status of bobwhite populations throughout portions of Illinois. Cooperating hunters are asked to contribute wings from harvested birds and to keep records of their hunting trips. Examination of the wings coupled with analysis of hunter success data provides valuable information about regional bobwhite populations including sex-age composition, hatching peaks, reproductive performance, and trends in abundance. By recording this information along with weather and land use conditions over a number of years, we are better able to understand how bobwhite populations are affected by changing environmental conditions. This cooperative project was begun in 1950 and represents the longest, continuous record ever compiled for a North American game bird. Long-term studies of this type are extremely valuable in that they provide historical perspective for interpreting past and current conditions, and facilitate prediction of future trends for management purposes.

Prior to the 1989 season, data had been collected annually from the southern 34 counties of Illinois. In 1989, hunter-cooperators were solicited from 15 additional counties in west-central Illinois. Study regions described in this report are shown in Figure 1.

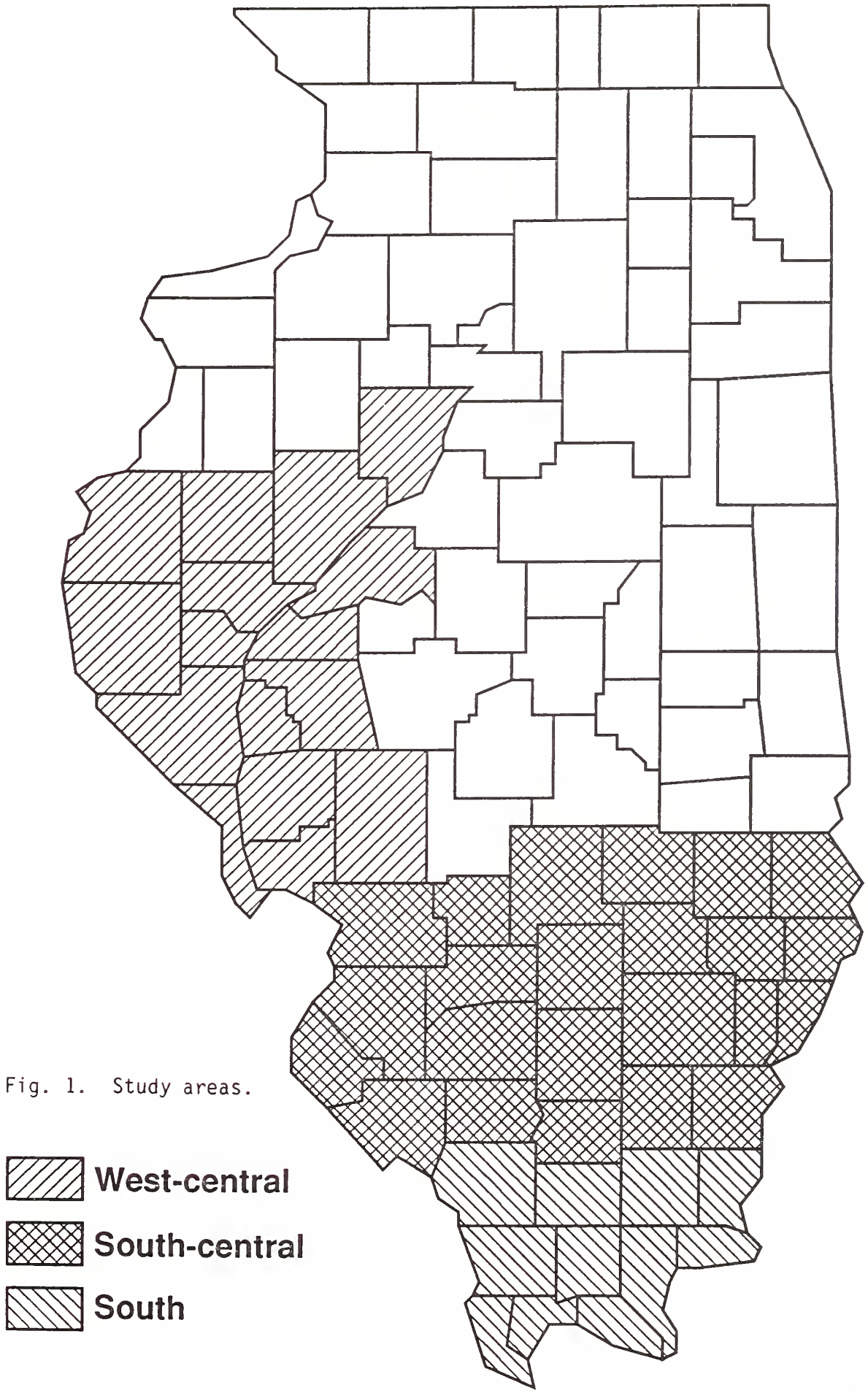

Fig. 1. Study areas.

Analysis of Quail Wings

Juvenile bobwhites (birds hatched the summer immediately preceding the hunting season) can be distinguished from adults (birds that have gone through at least 1 breeding season) based on appearance of certain wing feathers (primary coverts). The age of juveniles can be estimated to the nearest day based on progression of molt of another set of wing feathers (primaries). The ratio of juvenile to adult birds in the fall population gives an indication of the relative success of the previous breeding season. In general, the more young birds there are in relation to adults, the better the breeding season. However, a high ratio of young to adults does not always mean a high population in the fall. The number of breeding birds that were present at the start of nesting is also very important. In other words, relatively low individual productivity from a large number of breeders can still result in a good fall population. Conversely, individual production can be quite high, but if there were few breeders to begin with, fall numbers could still be low. Collection materials and requests for information were mailed to 298 selected quail hunters prior to the 1989 season. About 43% (127) of this group submitted a total of 5,898 wings (Table 1). The juvenile/adult ratios for the west-central, south-central, and south regions were 4.40, 5.23, and 3.98, respectively (Table 2). Age ratios for the latter 2 regions were near their respective long-term means, probably reflecting the generally favorable weather conditions during the 1989 breeding season. In contrast, west-central Illinois was considerably drier during the same period. However, no prior data are available to compare with this year's young:adult ratio.

Table 1. Sex/age breakdown of 5,898 bobwhite wings submitted by cooperating hunters during the 1989-90 open season in Illinois.

Region	Age	Males	Females	Unknown	Total
	Juvenile	852	827	30	1,709
West-Central	Adult	228	153	7	388
	Total	1,080	980	37	2,097
	Juvenile	1,054	1,051	39	2,134
South-Central	Adult	252	151	5	408
	Total	1,306	1,192	44	2,542
	Juvenile	494	475	37	1,006
South	Adult	162	84	7	253
	Total	656	559	44	1,259
	Juvenile	2,400	2,343	106	4,849
Entire Area	Adult	642	388	19	1,049
	Total	3,042	2,731	125	5,898

Table 2. Sex/age ratios of bobwhites harvested during the 1989-90 open season in Illinois.

Region	Percent Males		Juveniles/ Adult
	Juveniles	Adults	
West-Central	50.74	59.84	4.40
South-Central	50.31	62.53	5.23
South	50.98	65.85	3.98
Entire Area	50.60	62.33	4.62

Sex ratio information was also obtained from the wing collections (Table 2). The overall sex ratio among young birds was 51:49 in favor of males with little variation among regions. The sex ratio for adults was 62:38 in favor of males. Both of these ratios were within the range of normal variation. Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher mortality thereafter, especially during and after the breeding season. Therefore, hunters normally see about equal numbers of males and females among young birds but a preponderance of males among adults.

An index to the timing of the hatching season was obtained by backdating the estimated age of juveniles from their date of kill. Indices were very near the long-term averages indicating that the 1989 hatching season was neither unusually early or late. In addition, regional hatching indices were quite similar indicating that there was very little variation in timing of the hatch from west-central to extreme southern Illinois. Such information may be relevant to the establishment of opening dates for the hunting season.

Hunter Success and Opinions

Slightly less than half (147/298) of the hunters contacted returned their postseason questionnaire cards although not all answered every question. New cooperators in the west-central counties reported bagging 2,352 quail during 524 outings for a relatively high success rate of 4.49/trip (Table 3). In the south-central region, hunters took 3,966 birds during 1,225 hunts for a success rate of 3.08 quail/trip. Cooperators in the extreme southern counties logged 506 hunts and harvested 1,681 birds for a rate of 3.32/trip. As this was the first year that the west-

central region was included, there is no basis for comparison with past years. However, according to hunter opinion, the abundance of quail in 1989 was similar to 1988 (Fig 2). In the south-central region, the 1989 success rate of 3.08 birds/trip was 12% below the 1988 figure, 15% below the long-term average, and the lowest recorded since 1984. In agreement with these statistics, 56% of the hunters said the population was down from the previous year while only 10% thought it was up (Fig. 2). Hunter success in the south region (3.32 birds/trip) was 13% higher this year than last, and very near the average for the last 5 years. However, it was 17% below the long-term (1956-1988) average. Hunters in extreme southern Illinois were equally divided as to whether the population was up or down from the previous year (Fig. 2).

Table 3. Reported hunter success during the 1989-90 bobwhite season in Illinois.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
West-Central	28	2,352	524	4.49
South-Central	66	3,966	1,225	3.08
South	27	1,681	506	3.32
Entire Area	121	7,999	2,255	3.55

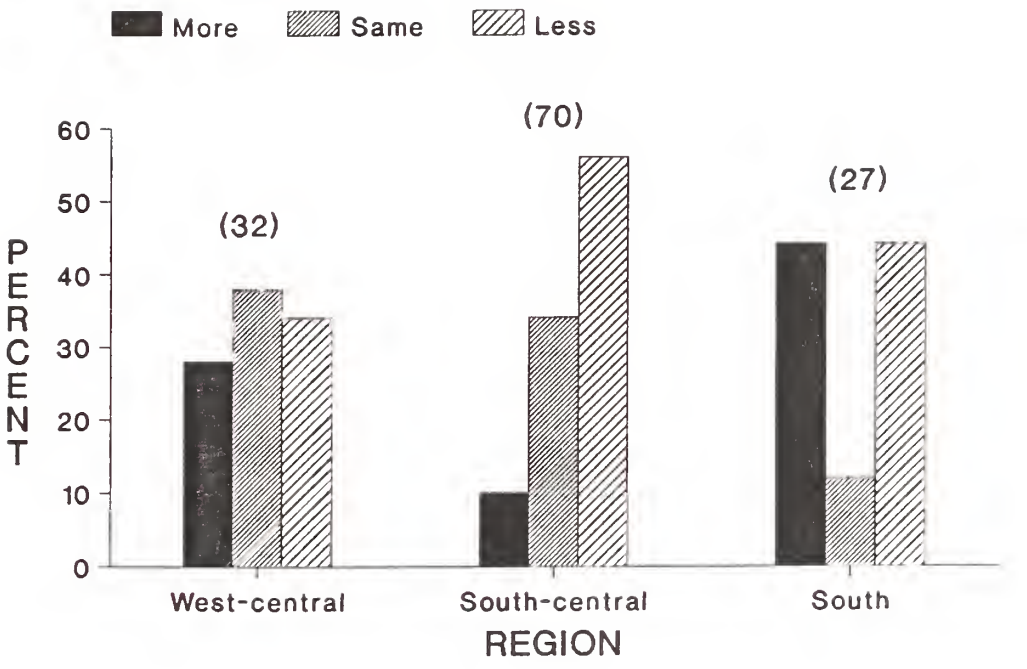

Fig. 2. Hunter opinions regarding the abundance of bobwhites in 1989 vs. 1988.

Illinois Quail Populations - Past, Present, and Future

Figure 3 shows an index of bobwhite abundance (kill/trip) in Illinois during the period 1956-1988 based on annual surveys of hunting license holders conducted by the Illinois Department of Conservation. The graph illustrates 2 important characteristics of bobwhite abundance - short-term fluctuations and long-term trends. Short-term fluctuations are those periodic ups and downs that quail populations typically go through. They are related mainly to weather factors (e.g., duration of snow cover in the Midwest), but there may be a cyclic component as well. Long-term trends, on the other hand, are influenced by habitat conditions which in turn are

determined primarily by land use and farming practices. Unfortunately for quail and other upland species, agricultural land use has become progressively more intensive with a shift away from diversified farming toward almost exclusive row crop production. This trend has been coupled with declines in weedy/grassy type cover, destruction of literally thousands of miles of woody fencerows and hedgerows, and a general loss of edge and diversity so essential for good bobwhite range. From the mid-50's to about 1970, there was a noticeable, but fairly gradual decline in bobwhite abundance due to the factors just mentioned. In the early 1970's, however, this downward trend accelerated as farmers began to plant "fencerow to fencerow". In the late 70's, the Midwest experienced 3 consecutive severe winters which depressed quail numbers to an all-time low. During this past decade of the 80's, there has been a gradual improvement in the overall trend despite temporary downswings such as that related to the 1988 drought (Fig. 3). It is not yet clear whether this upward trend reflects improving habitat conditions or merely the slow recovery from the weather-related lows of the late 1970's. Many people believe that the Conservation Reserve Program initiated as part of the 1985 Food Security Act (Farm Bill) offers potential for improving habitat conditions for upland wildlife in the Midwest. In reality, however, it is probably still too early to be able to demonstrate any positive effects on quail abundance at least on a regional or statewide level. Currently, Southern Illinois University, the Illinois Natural History Survey, and the Illinois Department of Conservation are engaged in a study to determine the impacts of farm programs (including CRP) on upland wildlife in Illinois, and how best to take advantage of the opportunities these programs offer.

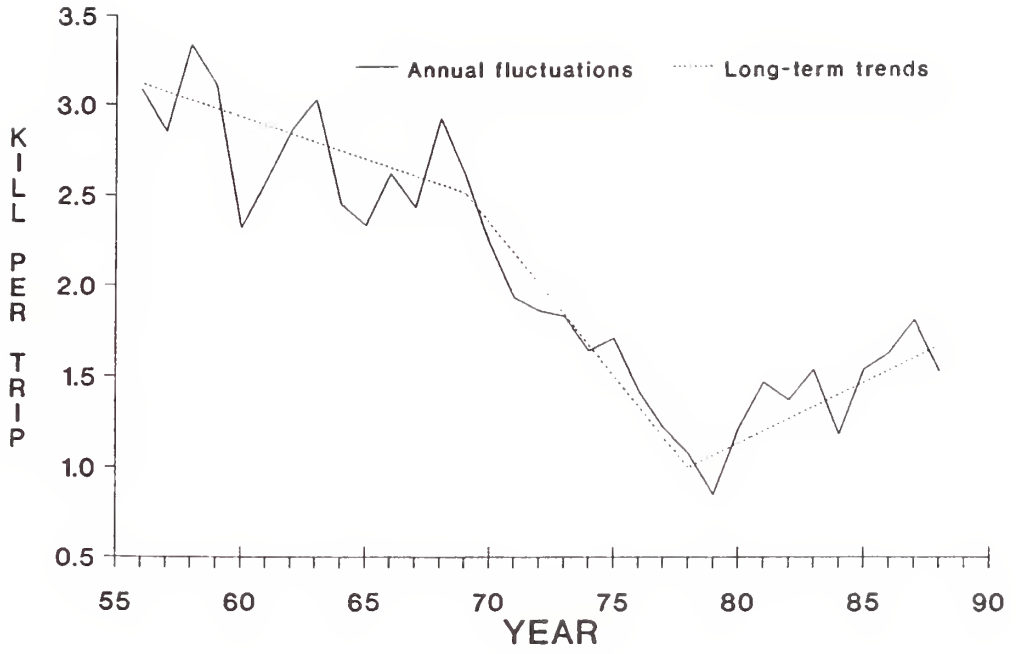

Fig. 3. Relative bobwhite abundance in Illinois, 1956-1988.

STATUS OF BOBWHITE POPULATIONS IN ILLINOIS 1990-91

Prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

Dr. Alan Woolf, Director

May 15, 1991

The Cooperative Wildlife Research Laboratory, SIU-C, and the Illinois Department of Conservation annually monitor the status of bobwhite populations throughout the primary quail range of Illinois. To help accomplish this, a select group of quail hunters is asked to contribute wings from harvested birds and to keep records of their hunting trips. Examination of the wings, coupled with analysis of hunter success provides valuable information about regional bobwhite populations including sex-age composition, hatching peaks, reproductive performance, and trends in abundance. By correlating this information with weather and land use conditions, we are better able to understand how bobwhite populations are affected by changing environmental conditions. This cooperative project was begun in 1950 and represents the longest continuous record ever compiled for a North American game bird. Long-term studies of this type are especially valuable because they provide historical perspective for interpreting past and current conditions, and facilitate prediction of future trends for management purposes.

Prior to the 1989 season, data were collected only from the southern 34 counties of Illinois. In 1989 and 1990, hunter-cooperators were solicited from 17 additional counties in westcentral Illinois. Study regions described in this report are shown in Figure 1.

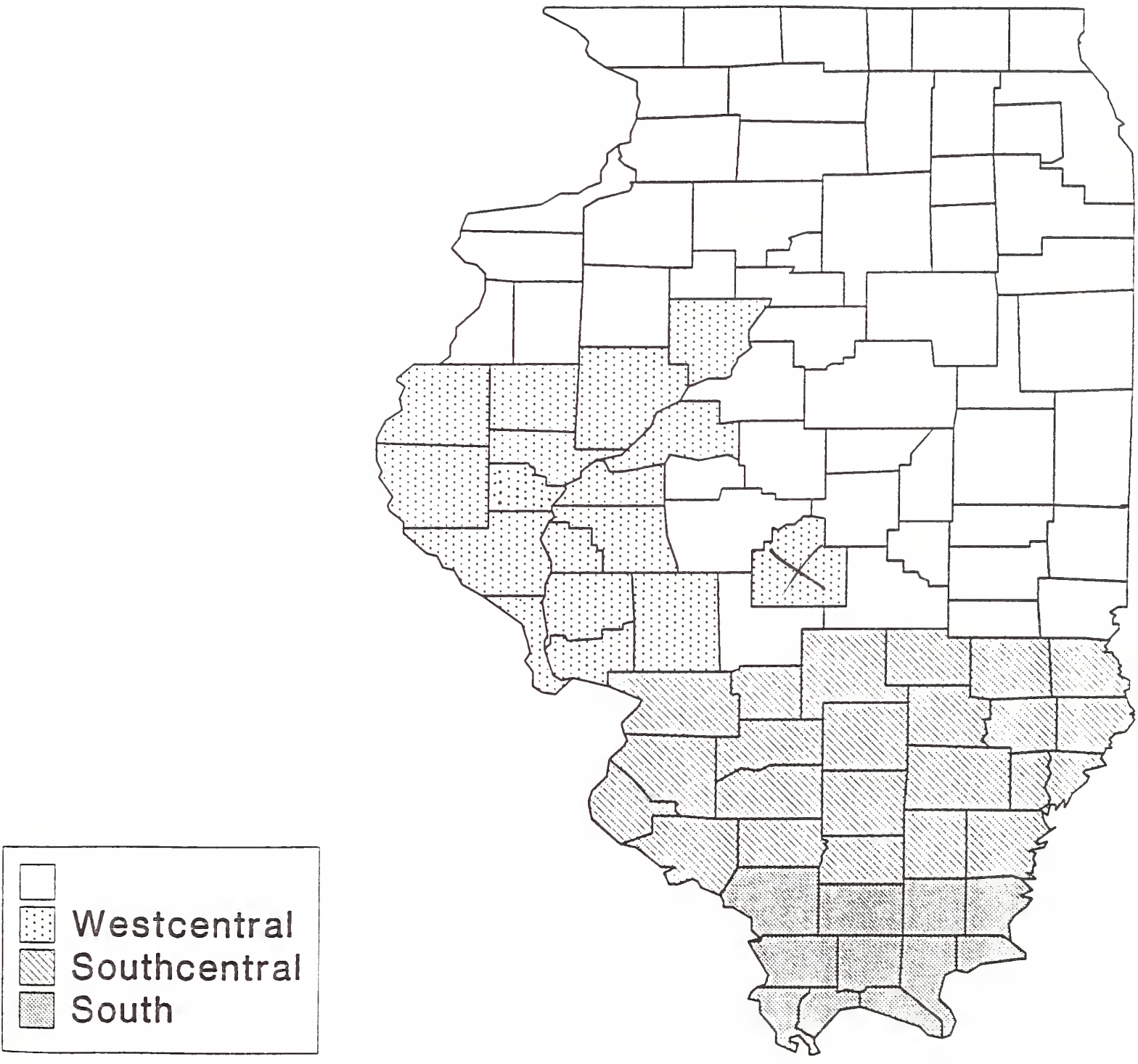

Fig. 1. Study regions.

Analysis of Quail Wings

Juvenile bobwhites (birds hatched the summer immediately preceding the hunting season) can be distinguished from adults (birds that have gone through at least 1 breeding season) based on appearance of certain wing feathers (primary coverts). The age of juveniles can be estimated to the nearest day based on progression of molt of another set of wing feathers (primaries). The ratio of juvenile to adult birds in the fall population gives an indication of the relative success of the previous breeding season. In general, the more young birds there are in relation to adults, the better the breeding season. However, a high ratio of young to adults does not always mean a high population in the fall. The number of breeding birds present at the start of nesting is also very important. In other words, relatively low individual productivity from a large number of breeders can still result in a good fall population. Conversely, individual production can be quite high, but if there were few breeders to begin with, fall populations could still be low.

Collection materials and requests for information were mailed to 310 selected quail hunters prior to the 1990 season. About 37% (116) of this group submitted a total of 5,444 wings (Table 1). Juvenile/adult ratios (Table 2) were similar in all 3 regions (range 4.21 - 4.32). These indices suggested that relative productivity was similar to last year in the South and Westcentral areas but somewhat lower in the Southcentral counties.

Table 1. Sex/age breakdown of 5,444 bobwhite wings submitted by cooperating hunters during the 1990-91 open season in Illinois.

Region	Age	Males	Females	Unknown	Total
Westcentral	Juvenile	892	855	5	1,752
	Adult	236	180	0	416
	Total	1,128	1,035	5	2,168
Southcentral	Juvenile	831	852	8	1,691
	Adult	224	166	1	391
	Total	1,055	1,018	9	2,082
South	Juvenile	489	465	11	965
	Adult	123	100	6	229
	Total	612	565	17	1,194
Entire Area	Juvenile	2,212	2,172	24	4,408
	Adult	583	446	7	1,036
	Total	2,795	2,618	31	5,444

Table 2. Sex/age ratios of bobwhites harvested during the 1990-91 open season in Illinois.

Region	Percent Males		Juveniles/ Adult
	Juveniles	Adults	
Westcentral	51.06	55.73	4.21
Southcentral	49.38	57.44	4.32
South	51.26	55.16	4.21
Entire Area	50.46	56.66	4.25

Sex ratio information was also obtained from the wing collections (Table 2). The overall sex ratio (male:female) was about 50:50 in young birds and 57:43 among adults. These ratios are within the range of normal variation; as with age ratios, there was little variation among regions. Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher mortality thereafter, especially during and after the breeding season. Therefore, hunters normally see about equal numbers of males and females among young birds but a preponderance of males among adults.

An index to the timing of the hatching season was obtained by backdating the estimated age of juveniles from their date of kill. These indices showed that the timing of the hatch was very similar to last year in the Westcentral and South regions, but was somewhat earlier in the Southcentral area.

Hunter Success and Opinions

Less than half (145/310) of the hunters contacted returned their postseason questionnaire cards. Cooperators in the Westcentral counties reported bagging 3,899 quail during 762 outings for a relatively high success rate of 5.12 birds per trip (Table 3). In the Southcentral region, hunters took 3,384 bobwhites during 933 hunts or 3.63 quail/trip. Cooperators in the South logged 542 hunts and harvested 1,784 birds for a success rate of 3.29/trip. These figures indicate relatively stable quail populations in the South, but increases of 14-18% in Westcentral and Southcentral Illinois. It should be remembered, however, that hunter success (kill/trip) is influenced not only by the abundance of quail, but also by weather and cover conditions during the hunting season.

Table 3. Reported hunter success during the 1990-91 bobwhite season in Illinois.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
Westcentral	44	3,899	762	5.12
Southcentral	62	3,384	933	3.63
South	31	1,784	542	3.29
Entire Area	137	9,067	2,237	4.05

Several hunters reported that 1990 populations were quite "spotty" - abundant in some areas, scarce in others. Overall, the general consensus was that numbers were up in 1990 compared to 1989, especially in westcentral and extreme southern Illinois (Fig. 2). Some hunters, however, notably in Jackson and Franklin counties, said 1990 was one of the worst seasons they had ever experienced.

Many cooperators also noted that the prolonged icing conditions last winter curtailed their late-season hunting activities, and some expressed concern about potential adverse effects on the birds. Because such conditions are relatively rare, there is not a great deal of statistical information regarding the impact of this type of weather on quail numbers the following year. However, based on what we know about the detrimental effects of extended snow coverage, last winter's ice conditions may well have caused problems for bobwhites in at least some parts of Illinois. Whether this translates into noticeably reduced numbers in 1991 is yet to be determined.

John Roseberry was invited to give a talk on "Managing the Harvest" at the 1989 Quail Unlimited Seminar in Kansas City, Missouri. To receive a free copy of that presentation, simply return the enclosed postcard with your name and mailing address.

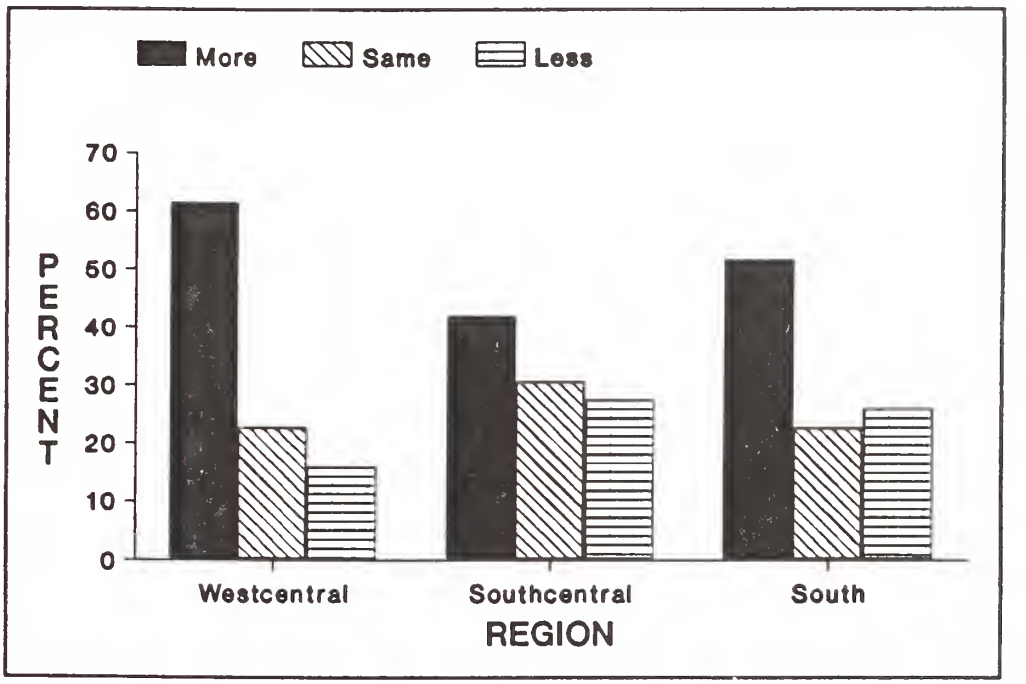

Fig. 2. Hunter opinions regarding the abundance of bobwhites in 1990 vs 1989.

STATUS OF BOBWHITE POPULATIONS IN ILLINOIS 1991-92

Prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

Dr. Alan Woolf, Director

June 1, 1992

The Cooperative Wildlife Research Laboratory, SIU-C, and the Illinois Department of Conservation annually monitor the status of bobwhite populations throughout the primary quail range of Illinois. To help accomplish this, a select group of quail hunters is asked to contribute wings from harvested birds and to keep records of their hunting trips. Examination of the wings, coupled with analysis of hunter success provides valuable information about regional bobwhite populations including sex-age composition, hatching peaks, reproductive performance, and trends in abundance. By correlating this information with weather and land use conditions, we are better able to understand how bobwhite populations are affected by changing environmental conditions. This cooperative project was begun in 1950 and represents the longest continuous record ever compiled for a North American game bird. Long-term studies of this type are especially valuable because they provide historical perspective for interpreting past and current conditions, and facilitate prediction of future trends for management purposes.

Prior to the 1989 season, data were collected only from the southern 34 counties of Illinois. Since that time, hunters in westcentral Illinois have also participated in the project. Study regions described in this report are shown in Figure 1.

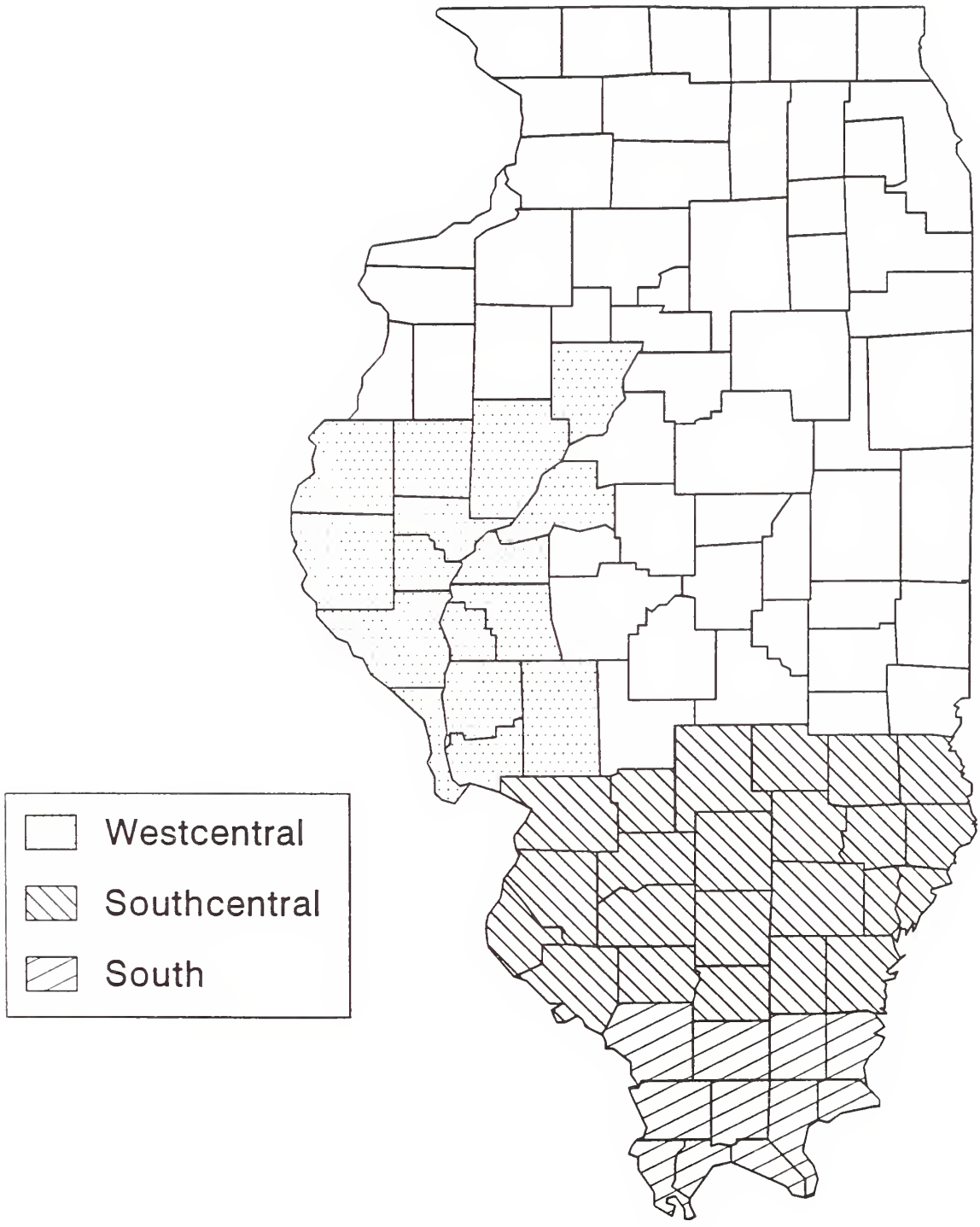

Fig. 1. Study regions for Illinois quail wing project.

Analysis of Quail Wings

Juvenile bobwhites (birds hatched the summer immediately preceding the hunting season) can be distinguished from adults (birds that have gone through at least 1 breeding season) based on appearance of certain wing feathers (primary coverts). The age of juveniles can be estimated to the nearest day based on progression of molt of another set of wing feathers (primaries). The ratio of juvenile to adult birds in the fall population gives an indication of the relative success of the previous breeding season. In general, the more young birds there are in relation to adults, the better the breeding season. However, a high ratio of young to adults does not always mean a high population in the fall. The number of breeding birds present at the start of nesting is also very important. In other words, relatively low individual productivity from a large number of breeders can still result in a good fall population. Conversely, individual production can be quite high, but if there were few breeders to begin with, fall populations could still be low.

Collection materials and requests for information were mailed to 316 selected quail hunters prior to the 1991 season. About 35% (112) of this group submitted a total of 4,072 wings (Table 1). Juvenile/adult ratios in the South, Southcentral, and Westcentral regions were 3.39, 4.35, and 4.13, respectively (Table 2). These indices suggested that relative productivity in the Southcentral and Westcentral counties was similar to last year but was lower in the South region.

Table 1. Sex/age breakdown of 4,072 bobwhite wings submitted by cooperating hunters during the 1991-92 open season in Illinois.

Region	Age	Males	Females	Unknown	Total
Westcentral	Juvenile	604	585	0	1,189
	Adult	164	124	0	288
	Total	768	709	0	1,477
Southcentral	Juvenile	668	688	0	1,356
	Adult	178	134	0	312
	Total	846	822	0	1,668
South	Juvenile	355	361	0	716
	Adult	128	83	0	211
	Total	483	444	0	927
Entire Area	Juvenile	1,627	1,634	0	3,261
	Adult	470	341	0	811
	Total	2,097	1,975	0	4,072

Table 2. Sex/age ratios of bobwhites harvested during the 1991-92 open season in Illinois.

Region	Percent Males		Juveniles/ Adult
	Juveniles	Adults	
Westcentral	50.80	56.94	4.13
Southcentral	49.26	57.05	4.35
South	49.58	60.66	3.39
Entire Area	49.89	57.95	4.02

Sex ratio information was also obtained from the wing collections (Table 2). The overall sex ratio (male:female) was about 50:50 in young birds and 58:42 among adults. These ratios are within the range of normal variation; there was little variation among regions. Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher mortality thereafter, especially during and after the breeding season. Therefore, hunters normally see about equal numbers of males and females among young birds but a preponderance of males among adults.

An index to the timing of the hatching season was obtained by backdating the estimated age of juveniles from their date of kill. These indices showed that there were fewer late hatched birds than normal in the South and Southcentral regions. Timing of the hatch in the Westcentral region was similar to the last 2 years.

Hunter Success and Opinions

Less than half (145/316) of the hunters contacted returned their postseason questionnaire cards. Cooperators in the Westcentral counties reported bagging 4,297 quail during 847 outings for a relatively high success rate of 5.07 birds per trip (Table 3). In the Southcentral region, hunters took 3,941 bobwhites during 1,013 hunts or 3.89 quail/trip. Cooperators in the South logged 620 hunts and harvested 1,967 birds for a success rate of 3.17/trip. Comparing these success rates with last years' figures suggests that quail numbers were down slightly in the South and Westcentral regions and up slightly in the Southcentral area. However, hunter success (kill/trip) is

influenced not only by the abundance of quail, but also by weather and cover conditions during the hunting season.

Table 3. Reported hunter success during the 1991-92 bobwhite season in Illinois.

Region	Hunters	Total Harvest	Number of Trips	Kill/Trip
Westcentral	37	4,297	847	5.07
Southcentral	51	3,941	1,013	3.89
South	35	1,967	620	3.17
Entire Area	123	10,205	2,480	4.11

In agreement with the kill/trip index, the general consensus among reporting hunters was that the 1991 quail population was down in the South and Westcentral regions and up slightly in the Southcentral (Fig. 2). Overall, 27% felt the population was higher in their area than the year before, 35% thought it was about the same, and 38% said it was smaller.

By now, most quail hunters have some knowledge of the Conservation Reserve Program. This was a provision of the 1985 Farm Bill that encouraged farmers to retire potentially erodible cropland for a 10-year period. Through the first 9 signup periods (1986-89), over 633,000 acres in Illinois were enrolled in the program and planted mainly to grasses. Last season, we asked cooperating hunters their opinion as to whether the CRP had helped, hurt, or had no effect on quail populations in their area. Figure 3 shows the results of that survey. In the South

region, 45% of the respondents thought CRP had been beneficial while 55% said in had no effect or had actually been harmful to quail. In contrast, 60% of the Southcentral and 64% of the Westcentral hunters felt that CRP had an overall positive effect on quail in their particular area. However, many of these hunters qualified their support by noting that CRP was beneficial only when fields were not frequently mowed or planted to fescue. Others commented that CRP fields aided only when they were located close to food supplies such as cropfields. The Cooperative Wildlife Research Laboratory and the Illinois Department of Conservation are about to complete a 3-year study to determine the effects of the CRP on bobwhite abundance at the local, regional, and statewide levels. This report will be made available to Illinois quail hunters when it is completed.

John Roseberry is presenting a paper at the upcoming Quail III Symposium in Kansas City titled "Changing Attitudes and Perceptions of Southern Illinois Quail Hunters. This paper describes results from post-season questionnaire cards dating back to the mid-1950's. To receive a free copy of this report, simply return the enclosed postcard with your name and mailing address.

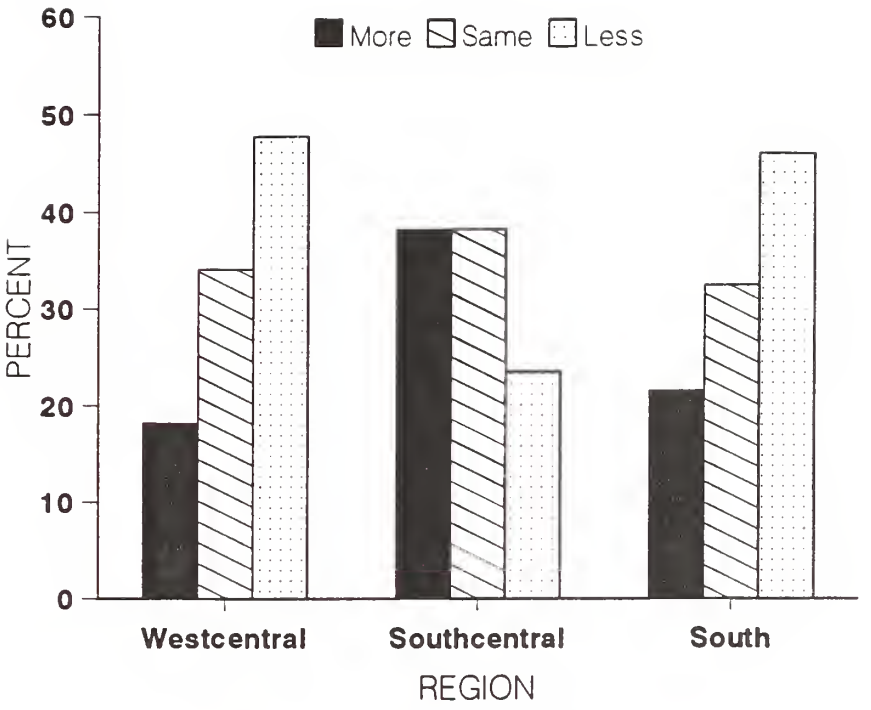

Fig. 2. Hunter opinion regarding bobwhite abundance in 1991 vs. 1990.

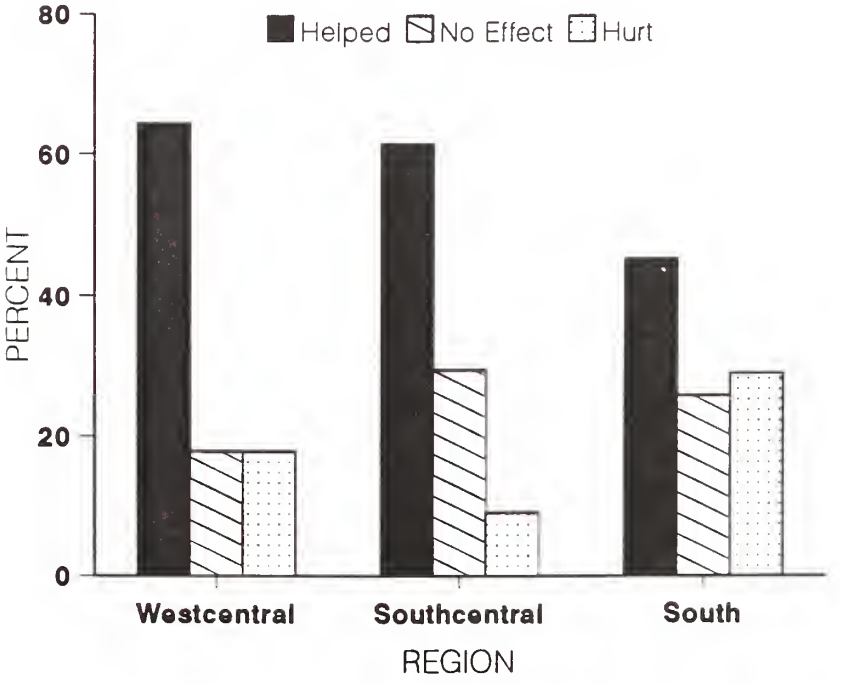

Fig. 3. Hunter opinion regarding the value of CRP to quail.

STATUS OF BOBWHITE POPULATIONS IN ILLINOIS 1992-93

Prepared by

John L. Roseberry

Distributed by

Cooperative Wildlife Research Laboratory

Southern Illinois University

Carbondale, Illinois

Dr. Alan Woolf, Director

May 1, 1993

The Cooperative Wildlife Research Laboratory, SIU-C, and the Illinois Department of Conservation annually monitor the status of bobwhite populations throughout the primary quail range of Illinois. To help accomplish this, we ask a select group of quail hunters to contribute wings from harvested birds and keep records of their hunting trips. Examination of the wings, coupled with analysis of hunter success data provides valuable information about regional bobwhite populations including sex-age composition, hatching peaks, reproductive performance, and trends in abundance. Correlating this information with weather and land-use conditions enables us to better understand how bobwhite populations are affected by changing environmental conditions. This cooperative project was begun in 1950 and represents the longest continuous record ever compiled for a North American game bird. Long-term studies of this type are especially valuable because they provide historical perspective for interpreting past and current conditions, and facilitate prediction of future trends for management purposes.

Prior to the 1989 season, data were collected only from the southern 34 counties of Illinois. Since 1990, hunters in westcentral Illinois have also participated in the project. Study regions described in this report are shown in Figure 1.

Analysis of Quail Wings

Juvenile bobwhites (birds hatched the summer immediately preceding the hunting season) can be distinguished from adults (birds that have gone through at least 1 breeding season) based on appearance of certain wing feathers (primary coverts). The age of juveniles can be estimated to the nearest day based on progression of molt of another set of wing feathers (primaries). The ratio of juvenile to adult birds in the fall population gives an indication of the relative success of the previous breeding season. In general, the more young birds there are in relation to adults, the better the breeding season. However, a high ratio of young to adults does not always mean a high population in the fall. The number of breeding birds present at the start of nesting is also very important. In other words, relatively low individual productivity from a large number of breeders can still result in a good fall population. Conversely, individual production can be quite high, but if there were few breeders to begin with, fall populations might still be low.

Collection materials and requests for information were mailed to 305 selected quail hunters prior to the 1992 season. About 38% (115) of this group submitted a total of 5,921 wings (Table 1). Juvenile/adult ratios in the South, Southcentral, and Westcentral regions were 2.88, 3.88, and 3.45, respectively (Table 2). These indices suggest that relative production was down about 10-15% from the previous year (1991).

Sex ratio information was also obtained from the wing collections (Table 2). The overall sex ratio (male:female) was about 51:49 in young birds and 58:42 among adults. These ratios were considered normal and there was little variation among regions. Bobwhites hatch at about a 50:50 sex ratio, but females suffer slightly higher mortality thereafter, especially during and after the breeding season. Therefore, hunters normally see about equal numbers of males and females among young birds but a preponderance of males among adults.

Hunter Success and Opinions

Less than 40% (120/305) of the hunters contacted returned their postseason questionnaire cards. Cooperators in the Westcentral counties reported bagging 2,594 quail during 535 outings for a success rate of 4.85 birds per trip (Table 3). In the Southcentral region, hunters took 4,314 bobwhites during 1,164 hunts or 3.71 quail/trip. Cooperators in the South logged 533 hunts and harvested 1,408 birds for a success rate of 2.64 quail/trip. Hunter success rates were down from the previous year in all regions (4% in Westcentral, 5% in Southcentral and 17% in South). As noted in previous reports, however, this index (kill/trip) reflects not only relative quail abundance, but also weather and cover conditions during the hunting season.

The overall kill/effort index declined about 9% from 1991 to 1992. This agrees with results of our opinion survey in which 78% of the hunters said the quail population in their area

was similar to or lower than the previous year compared to only 22% who thought it was higher. This general pattern was evident in all regions, but was more pronounced in the Westcentral part of Illinois (Fig. 2).

The Conservation Reserve Program

The Cooperative Wildlife Research Laboratory and the Illinois Department of Conservation recently completed a study to determine if the Conservation Reserve Program (CRP) had resulted in increased regional or statewide quail populations in Illinois. The following are some of the major findings and conclusions from that study:

1. The Conservation Reserve Program (CRP) was a provision of the 1985 Farm Bill that encouraged landowners to retire highly erodible cropland for a minimum of 10 years. Various optional cover plantings (Conservation Practices or CPs) were available including grass/legume mixtures, shrubs, and trees.

2. Over 633,000 acres in Illinois were enrolled in the program during the 1st 9 signup periods (1986-1989). Since our study, total enrollment (through signup 12) has risen to 822,130 acres. During signups 1-9, 87% was of the CRP acreage was planted to cool-season grasses and legumes (CP-1) whereas only 1-2% was put into CP-2 (native warm season grasses) or CP-4 (wildlife habitat). Orchard grass, timothy, smooth brome, redtop, and tall fescue were the most commonly planted grasses in CP-1 fields. Alfalfa, Korean lespedeza, ladino clover, and red clover were the most common legumes.

3. Mowing of CRP fields is technically permitted only for "weed control" and is not required by law. Nevertheless, annual mowing of CRP fields is a very common practice in many parts of Illinois.

4. Regional and statewide bobwhite population trends from 1983 through 1991 were determined from Illinois Department of Conservation post-season hunter questionnaires and male bobwhite whistling counts recorded along 50 standardized routes each summer. Trends were compared among groups of counties classified according to relative amount of land enrolled in the CRP.

5. Overall regional or statewide bobwhite population trends, as measured by kill/hunter trip and kill/square mile, did not seem to be significantly affected by the CRP.

6. Male bobwhite call counts in the South and Westcentral regions may have been positively related to amounts of CRP land, but this could have simply been a local effect, i.e., breeding birds temporarily attracted to the grassy vegetation in the vicinity of call routes.

7. We concluded that overall quail abundance was not markedly increased by the CRP because positive effects in some areas were offset by neutral or negative effects in other localities.

8. Over 93% of all CRP land in Illinois was planted to grass or a grass/legume mix and could potentially serve as nesting, brood rearing, or roosting cover, but would provide little or no winter food or cover. Therefore, in areas where food and cover were limiting, conversion of cropland to CRP might not benefit

quail and could actually be detrimental if the replaced cropland had been an important winter food source.

9. Even in areas where nesting cover was limiting, CRP fields would be of little value if they were planted to fescue or were mowed too frequently.

10. The CRP had the potential to improve quail populations in Illinois but this potential was not fully realized. We believe the following would substantially improve the value of CRP for quail:

a) Reduction or elimination of mowing activities, especially mid-summer mowing.

b) Encouragement of more weedy vegetation through strip discing and controlled burning.

c) More land enrolled in CP-2 and CP-4 contracts and less in CP-1.

d) More use of timothy/redtop/Korean lespedeza in CP-1 fields and less use of tall fescue.

e) More provision of food in the form of food plots or Korean lespedeza seedings.

11. Enhancing the contribution of CRP to wildlife will require action at the national level where contract terms and provisions are established and at the local level where Soil Conservation Service and ASCS officials advise individual farmers. Individual hunters and sportsmen's groups should make lawmakers, Department of Agricultural officials, and individual landowners aware of their concerns for improving wildlife opportunities on retired acres.

Table 1. Sex/age breakdown of 5,921 bobwhite wings submitted by cooperating hunters during the 1992-93 open season in Illinois.

Region	Age	Males	Females	Unknown	Total
Westcentral	Juvenile	574	588	30	1,192
	Adult	198	140	8	346
	Total	772	728	38	1,538
Southcentral	Juvenile	1,281	1,210	4	2,495
	Adult	372	271	0	643
	Total	1,653	1,481	4	3,138
South	Juvenile	447	422	55	924
	Adult	164	128	29	321
	Total	611	550	84	1,245
Entire Area	Juvenile	2,302	2,220	89	4,611
	Adult	734	539	37	1,310
	Total	3,036	2,759	126	5,921

Table 2. Sex/age ratios of bobwhites harvested during the 1992-93 open season in Illinois.

Region	Percent Males		Juveniles/ Adult
	Juveniles	Adults	
Westcentral	49.40	58.58	3.45
Southcentral	51.43	57.85	3.88
South	51.44	56.16	2.88
Entire Area	50.91	57.66	3.52

Table 3. Reported hunter success during the 1992-93 bobwhite season in Illinois.

Region	Hunters	Total Harvest[a]	Number of Trips[a]	Kill/Trip
Westcentral	24	2,594	535	4.85
Southcentral	59	4,314	1,164	3.71
South	24	1,408	533	2.64
Entire Area	107	8,316	2,232	3.73

[a] Totals may include additional members of hunting party.

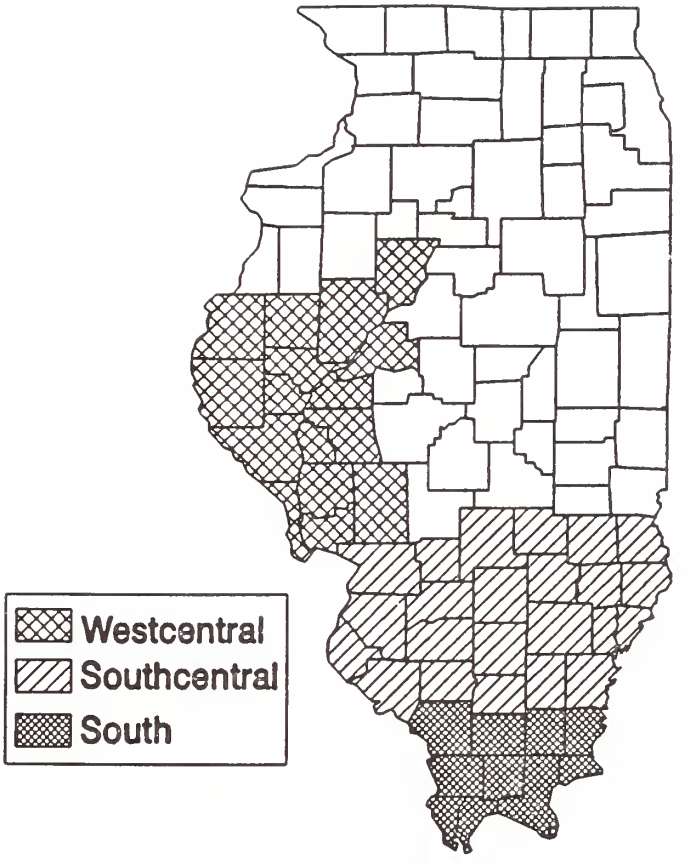

Fig. 1. Study regions for Illinois quail wing project.

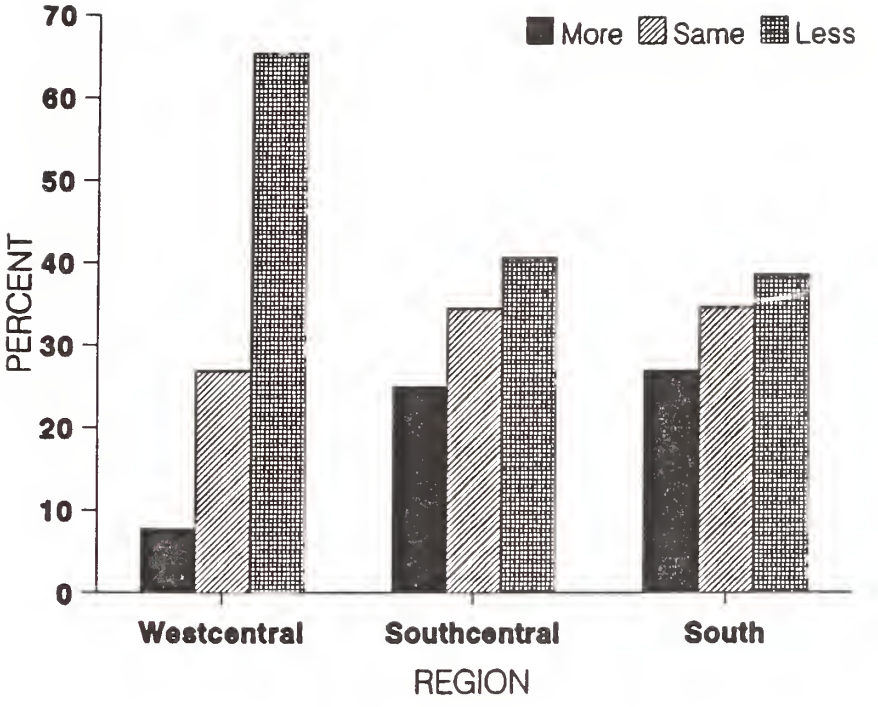

Fig. 2. Hunter opinions regarding bobwhite abundance in 1992 vs. 1991.

STATUS OF BOBWHITE POPULATIONS IN ILLINOIS 1993-94

Prepared by

John L. Roseberry

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Dr. Alan Woolf, Director

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The Cooperative Wildlife Research Laboratory, SIU-C, and the Illinois Department of Conservation annually monitor the status of bobwhite populations throughout the primary quail range of Illinois. To help accomplish this, we ask a select group of quail hunters to contribute wings from harvested birds and to keep records of their hunting trips. Examination of the wings, coupled with analysis of hunter success data provides valuable information about regional bobwhite populations including sex-age composition, hatching peaks, reproductive performance, and trends in abundance. Correlating this information with weather and land-use conditions enables us to better understand how bobwhite populations are affected by changing environmental conditions. This cooperative project was begun in 1950 and represents the longest continuous record ever compiled for a North American game bird. Long-term studies of this type are especially valuable because they provide historical perspective for interpreting past and current conditions, and facilitate prediction of future trends for management purposes.

Prior to the 1989 season, data were collected only from the southern 34 counties of Illinois. Since 1990, hunters in westcentral Illinois have also participated in the project. Study regions described in this report are shown in Figure 1.

Analysis of Quail Wings

Juvenile bobwhites (birds hatched the summer immediately preceding the hunting season) can be distinguished from adults (birds that have gone through at least 1 breeding season) based on appearance of certain wing feathers (primary coverts). The age of juveniles can be estimated to the nearest day based on progression of molt of another set of wing feathers (primaries). The ratio of juvenile to adult birds in the fall population gives an indication of the relative success of the previous breeding season. In general, the more young birds there are in relation to adults, the better the breeding season. However, a high ratio of young to adults does not always mean a high population in the fall. The number of breeding birds present at the start of nesting is also very important. In other words, production per individual hen can be quite high, but if there were few breeders to begin with, fall populations might still be low. Conversely, a large breeding population can still produce a relatively good fall crop even if individual productivity is only average.

Collection materials and requests for information were mailed to 296 selected quail hunters prior to the 1993 season. About 33% (99) of this group submitted a total of 5,540 wings (Table 1). Juvenile/adult ratios in the South, Southcentral, and Westcentral regions were 4.25, 5.24, and 4.33, respectively (Table 2). These ratios are considerably higher than those recorded in 1992 for all regions.

Sex ratio information was also obtained from the wing collections (Table 2). About 49% of the juveniles and 56% of the adults were males. Bobwhites hatch at about a 50:50 sex ratio, but female suffer slightly higher mortality thereafter, especially during and after the breeding season. Therefore, hunters normally see about equal numbers of males and females among young birds but a preponderance of males among adults.

Hunter Success and Opinions

About 42% (125/299) of the hunters contacted returned their postseason questionnaire cards. Cooperators in the Westcentral counties reported bagging 1,744 quail during 378 outings for a success rate of 4.61 birds per trip (Table 3). In the Southcentral region, hunters took 4,710 bobwhites during 1,161 hunts or 4.06 quail/trip. Cooperators in the South logged 567 hunts and harvested 2,081 birds for a success rate of 3.67 quail/trip. Hunter success in the Westcentral Region was down 5% from the previous year, but rates were up 10% in the Southcentral and 39% in the South regions over last year. The overall kill/effort index was 15% higher in 1993 than in 1992. As noted in previous reports, however, this index reflects not only relative quail abundance, but also weather and cover conditions during the hunting season.

The regional opinion surveys (Fig. 2) generally agreed with the hunter success rates. Both sources of information indicated a declining population in the Westcentral Region but increasing numbers in the Southcentral and South Regions.

Table 1. Sex/age breakdown of 5,540 bobwhite wings submitted by cooperating hunters during the 1993-94 open season in Illinois.

Region	Age	Males	Females	Unknown	Total
Westcentral	Juvenile	474	500	0	974
	Adult	118	107	0	225
	Total	592	607	0	1,199
Southcentral	Juvenile	1,324	1,372	116	2,812
	Adult	297	218	22	537
	Total	1,621	1,590	138	3,349
South	Juvenile	365	389	49	803
	Adult	101	79	9	189
	Total	466	468	58	992
Entire Area	Juvenile	2,163	2,261	165	4,589
	Adult	516	404	31	951
	Total	2,679	2,665	196	5,540

Table 2. Sex/age ratios of bobwhites harvested during the 1993-94 open season in Illinois.

Region	Percent Males		Juveniles/ Adult
	Juveniles	Adults	
Westcentral	48.66	52.44	4.33
Southcentral	49.11	57.57	5.24
South	48.41	56.11	4.25
Entire Area	48.89	56.09	4.83

Table 3. Reported hunter success during the 1993-94 bobwhite season in Illinois.

Region	Hunters	Total Harvest[a]	Number of Trips[a]	Kill/Trip
Westcentral	24	1,744	378	4.61
Southcentral	57	4,710	1,161	4.06
South	31	2,081	567	3.67
Entire Area	112	8,535	2,106	4.05

[a] Totals may include additional members of hunting party.

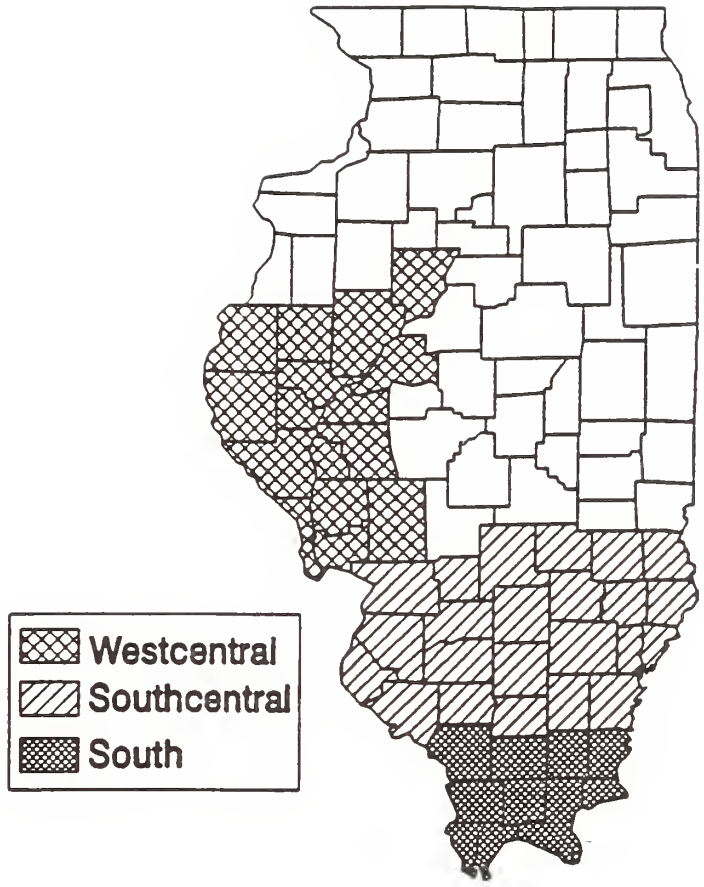

Fig. 1. Study regions for Illinois quail wing project.

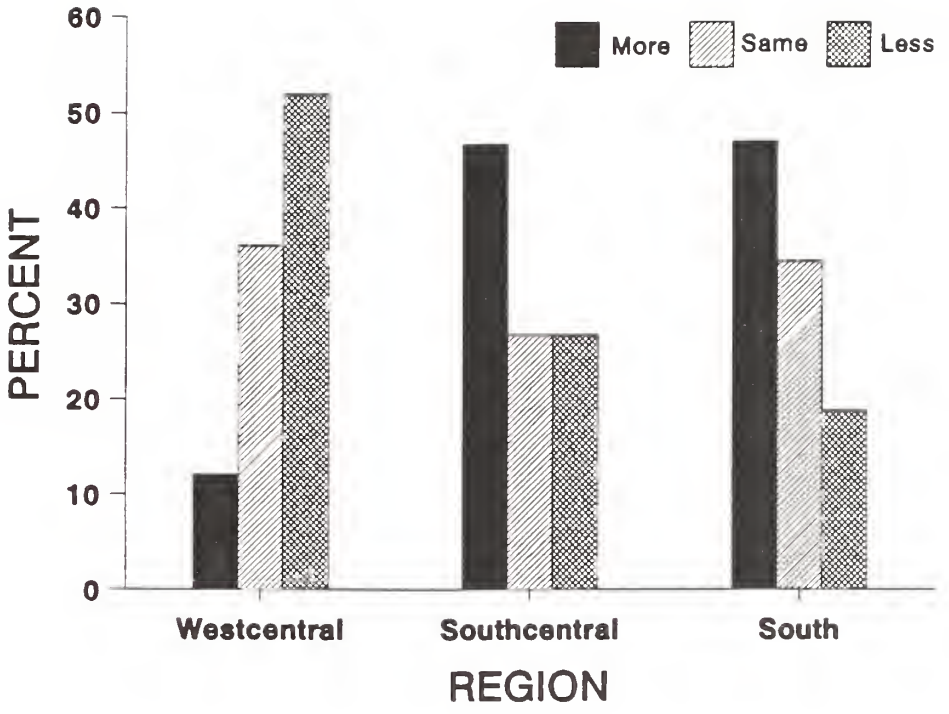

Fig. 2. Hunter opinions regarding bobwhite abundance in 1993 vs. 1992.